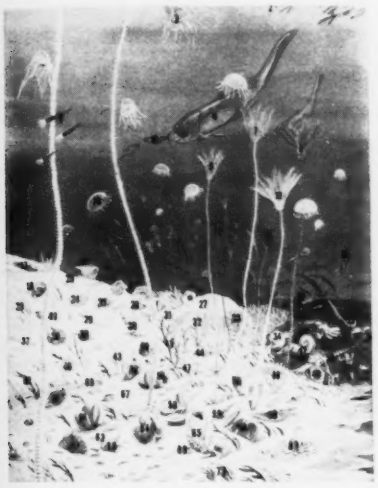
THE CONSERVATIONIST

State of New York Conservation Department December-January 1961-62

Legend

The painting on the facing cover is a reconstruction of life on this earth as it existed some 365 million years ago in the Hamilton sea, what we know now as the Finger Lakes region of New York. Species are identified below:



1. FLOATING SEAWEED; 2. SMOOTH-CONE MOLLUSK (*Styliolina*); 3. JELLYFISH (*Plectodiscus*); 4. ARTHRODIRE (*Dinichthys*); 5. RINGED-CONE MOLLUSK (*Tentaculites*); 6. SHARK (*Cladoselache*); 7. SEA-"LILY," CRINOID (*Gennaeocrinus*); 8. SEA-"LILLY," CRINOID (*Melocrinites*); 9. SEA-"LILLY," CRINOID (*Ancyrocrinus*); 10. JELLYFISH (*Paropsonema*); 11. SEA-"LILLY," CRINOID (*Thylacocrinus*); 12. BLASTOID (*Devonoblastus*); 13. STARFISH (*Taeniaster*); 14. SNAIL ON CRINOID; 15. BLASTOID (*Nucleocrinus*); 16. NAUTILOID CEPHALOPOD (*Ovaceras*); 17. TRILOBITE (*Dipleura*); 18. SCALLOP (*Actinopteria*); 19. STARFISH (*Devonaster*) ON CLAM; 20. STAR-DISC (*Agelacrinites*); 21. SCALLOP (*Cornellites*); 22. SPIKE-BACK ARMORED FISH (*Machaeracanthus*); 23. ALGAE (*Thamnocladus*); 24. CLAM (*Leptodesma*); 25. CLAM (*Grammysia*); 26. CLAM (*Cypricardella*); 27. HONEYCOMB CORAL (*Favosites*); 28. TRILOBITE IN BURROW; 29. SEA WORM (*Protonympha*); 30. SNAIL (*Loxonema*); 31. CORAL (*Pleurodictyum*); 32. CORAL (*Eridophyllum*); 33. CORAL (*Syringopora*); 34. AMMONOID CEPHALOPOD Tornoceras); 35. BRACHIOPOD (*Chonetes*); 36. BRACHIOPOD (*Leiorhynchus*); 37. FLOW MARKING; 38. CLAM (*Lunulicardium*); 39. ENROLLED TRILOBITE (*Phacops*); 40. SNAIL (*Bembexia*); 41. BRYOZOAN (*Taenipora*); 42. NAUTILOID CEPHALOPOD (*Centroceras*); 43. BRYOZOAN (*Bactropora*); 44. CLAM (*Goniophora*); 45. BRYOZOAN (*Fenestrellina*); 46. BRACHIOPOD (*Leptaena*); 47. CORAL (*Metriophyllum*); 48. CORAL (*Syringopora*); 49. CORAL (*Heliophyllum*); 50. NAUTILOID CEPHALOPOD (*Geisenoceras*); 51. CONE-HYDRAS, CONULARID (*Conularia*); 52. ALGA; 53. TRILOBITE (*Phacops*); 54. BRACHIOPOD (*Atrypa*); 55. CORAL ON CORAL (*Aulopora on Zaphrentis*); 56. TRILOBITE (*Proetus*); 57. BRYOZOAN (*Acanthoclema*); 58. BRACHIOPOD (*Athyris*); 59. SNAIL (*Loxonema*); 60. BRACHIOPOD (*Mucrospirifer*); 61. BRACHIOPOD (*Tropidoleptus*); 62. BRACHIOPOD (*Elytha*); 63. TUBE WORMS (*Cornulites*); 64. SNAIL (*Phragmosphaera*); 65. BRYOZOAN ON CORAL (*Hederella on Heliophyllum*); 66. BRACHIOPOD (*Spinocyrtia*); 67. RINGED-CONE MOLLUSK (*Tentaculites*); 68. BRACHIOPOD (*Brachyspirifer*); 69. TRILOBITE (*Greenops*); 70. ALGAE (*Thamnocladus*).

THE CONSERVATIONIST

State of New York Conservation Department

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Filling Your Order for Recreation Land

by C. W. Mattison,
Land Acquisition Consultant,
N. Y. S. Conservation Dept.

ANY $2-billion-a-year business is big business. It's big if it's spread over the entire nation. It's a lot bigger, however, when it's confined to a single state.

In New York State, outdoor recreation is that kind of a business *now*—and increasing every year. During the last ten years the State gained 10 per cent in population. That's impressive. But during the same period, New Yorkers seeking outdoor recreation increased 300 per cent. And that is even more impressive! This tremendous increase took place despite the fact that the Conservation Department's 1959 recreation survey, conducted at the request of Governor Rockefeller, showed an acute shortage of almost every facility needed and used by recreationists. This deplorable condition had been suspected. The survey proved it!

State officials promptly informed the people of New York of this outdoor recreation deficit and proposed the first step necessary to overcome it—*the immediate public acquisition of the lands and waters needed for present and future outdoor recreation.*

Governor Rockefeller immediately recommended, and the Legislature approved, an action program to acquire lands and waters for recreation purposes without delay. Known as the $75,000,000 Park and Recreation Land Acquisition Bond Act, it became Proposition No. 1 on the 1960 ballot. Designated as Article 16-C of the Conservation Law, the Legislature's "Declaration of Purpose" expressed that body's concern for outdoor recreation:

"The disappearance of open and natural lands, particularly in and near rapidly growing urban and suburban areas, is of grave concern to the Legislature and to the people of the State. Once such lands are used for residential or commercial purposes, they are often permanently rendered unsuitable for parks, conservation or other recreation purposes. The present and future needs of the growing population of the State require the immediate acquisition of such lands for park, conservation, and other recreation purposes. This act is designed to specify the manner in which the moneys resulting from the sale of bonds authorized by the park and recreation land acquisition bond act shall be expended."

New York State voters overwhelmingly approved the Proposition. The State was on its way to getting the land its people need for their enjoyment of the outdoors.

The Bond Act recognizes the several different political subdivisions having responsibility for the provision of outdoor recreation areas in New York. It also sets up an entirely new principle by authorizing grants in aid to municipalities to assist them in the purchase of needed land for parks and recreation. Accordingly, the $75,000,000 is broken down into five broad classifications under Section 879, Allocation of Moneys.

"For the acquisition of lands for State park purposes, twenty million dollars ($20,000,000).

"For the acquisition of lands for other than State park or municipal park purposes, to provide additional opportunities for outdoor recreation, including public camping, fishing, hunting, boating, winter sports, and wherever possible, to also serve multiple purposes involving the conservation and development of natural resources, including the preservation of scenic areas, watershed protection, forestry and reforestation, fifteen million dollars ($15,000,000).

"For State aid in the amount of seventy-five per cent of the cost of acquisition of land for parks by cities other than the City of New York, or by improvement districts within cities other than the City of New York, $12,000,000.

"For State aid in the amount of seventy-five per cent of the cost of acquisition of land for parks by the City of New York, or by improvement districts therein, $12,000,000.

"For State aid in the amount of seventy-five per cent of the cost of acquisition of land for parks by counties, towns and villages, or by improvement districts therein, $16,000,000."

Standards for acquisition are simple. Section 881 of the Act describes them: 1. Lands acquired for State park purposes shall be for additions to existing State parks or for the establishment of new State parks of substantial acreage. 2. Lands acquired for State or municipal parks shall consist of predominantly open or natural lands, including lands under water or forested lands, in or near urban or suburban areas, or suitable to serve the recreation needs of the expanding populations of growing metropolitan regions, or desirable to preserve the scenery or natural resources thereof. 3. Lands acquired by a municipality shall be for establishing new parks of not less than fifty acres each in area, or for expanding existing parks to not less than fifty acres each by the addition of not less than twenty-five acres to such a park. 4. Lands acquired for other than State or municipal park purposes shall consist of lands desirable for outdoor recreation, including public camping, fishing, hunting, boating, winter sports, and wherever possible, to also serve multiple purposes involving the conservation and development of natural resources, including the preservation of scenic areas, watershed protection, forestry and reforestation.

A year has passed since the Bond Act was approved. Despite necessary preliminary work such as surveys, appraisals and negotiations, acquisition progress has been good. The purchase price for each parcel of land is based on a careful appraisal of the property to establish fair market value.

Several million dollars have already changed hands. The State has to be fussy about titles, however. It takes time for the Law Department to carefully search and clear titles prior to closing and payment by the Comptroller. Hence, the elapsed time may vary from four to nine months after the owner signs the purchase agreement until he is paid. This may seem like unnecessary delay but it does insure both the State and the vendor against future "comebacks" because of some flaw in the title.

A quick summary of over-all progress shows the *State Council of Parks*, because of its over-the-years planning for park expansion, has pin-pointed enough specific areas to account for its $20 million. Most of these properties are geared to the need for intensive, high capacity recreation, include valuable waterfront close to populace areas, and tend to be more costly types of land.

Of the eighteen new State park areas programed, fifteen are on important waterfronts, one on Long Island Sound, five on the Great Lakes (or the Niagara and St. Lawrence rivers), three on the Finger Lakes, and seven on other interior waters. More than half of the scheduled thirty-six additions to existing State parks also involves important waterfront acquisitions, mostly salt water frontage on Long Island and waterfronts on the Great Lakes, Niagara and St. Lawrence rivers. At least twenty-five miles of valuable salt- and fresh-water frontage are involved in this State park acquisition program.

New York City has tentatively obligated its $12 million for park lands within the city.

Upstate cities are having a little more difficulty in formulating and filling out their programs to the amount allocated. The difficulty of finding suitable tracts of sufficient area, the high cost of urban land and the over-all fiscal problems of many cities contribute to this delay.

Counties, towns and villages, on the other hand, have submitted almost enough proposals to account for their $16 million.

Future CONSERVATIONIST articles will report comprehensive progress under these classifications in more detail. The remainder of this article is devoted to the acquisition of State lands other than parks for which $15,000,000 is available.

Seven different categories make up this classification. They are: Public Campsites, Boat Launching Sites, Wilderness Consolidation and Access, Wetlands, Multiple Use Areas, Fishing Rights and Ski Centers and Special Uses.

Varying in size from a part of an acre for some special use to as much as 50,000 acres for wilderness consolidation, over 2,400 properties are presently listed in the Department for acquisition consideration under the several categories. An encouraging factor is that almost daily other properties are offered to the State by owners who wish to dispose of their holdings.

Properties in general in this classification are relatively small in size. Except for waterfront and some other high value lands, they are generally cheaper than lands being acquired for State and municipal park purposes. It often requires acquisition of several parcels to consolidate purchases into an area of sufficient size for economic and efficient administration and management. Fortunately, many available ownerships are contiguous to existing State lands. Their acquisition helps to consolidate State ownership and make larger areas available for outdoor recreation. Because so many more properties are involved, acquisition of State lands other than parks is slower than for State parks themselves. In the aggregate, however, much more land is involved.

Jones Beach—a clear argument for park and waterfront

Acquisition did not get under way until April, 1961. Even so, during the ensuing seven months, more than 225 agreements have been signed for the purchase of about 40,000 acres and 17 miles of fishing rights at a total cost of about $1,700,000. Consummation of current negotiations will increase the rate of progress in all categories.

Large scale acquisition of lands for public use is an involved process requiring careful study. In the Conservation Department's planning for the orderly

Hopefuls awaiting a vacancy at our popular but overcrowded campsites

purchase of State lands other than parks, it was apparent that needs were particularly critical in the seven categories previously listed. Accordingly, the Department concentrates only on lands which meet the requirements for the specific future recreation use contemplated.

With *camping* the fastest growing outdoor recreation activity in New York and the nation, the State's 38 public campsites in the Forst Preserve region are grossly inadequate to meet current demands. They can accomodate only 19,000 campers and 31,000 day users at any one time. Thousands of would-be campers are turned away and even more thousands wait for hours for campsite vacancies. Unless additional areas are purchased and developed, these unfortunate circumstances will continue and be aggravated. To help alleviate this condition the Department plans to acquire the necessary new public campsites under the Bond Act. Since Bond Act moneys can be used for land acquisition only, development will come later as funds are made available. As of now, 11 parcels for new campsites or additions to existing areas are under purchase agreement. Most, but not all, are in Forest Preserve counties.

Another rapidly growing form of outdoor activity is *recreational boating*. While it is increasing at an annual rate of 14 per cent nationwide, in New York State the rate is even greater. Boating needs both water and land—land for access to rivers and lakes, for parking cars and trailers, for services. Public boat launching sites on key waterways and lakes are inadequate to meet the demand and are becoming increasingly difficult to find. The Department wants to make sure that boat owners can get their boats in the water. Hence, its plans call for at least 250 launching sites during the next few years. Three new sites are under purchase agreement. On some waterfront properties purchased for other purposes, there are "bonus" areas which meet the specifications for development of future launching sites.

In New York State there is still *wilderness*. Richard E. McArdle, Chief, U. S. Forest Service, the agency which so ably administers 14½ million acres of wilderness in the National Forests across the nation, has said: "Wilderness is an integral part of our American heritage. Our nation was born in wilderness, and from it we took land and materials to build our country. The freedom of wild lands, their great open spaces, and their grandeur are interwoven in our history, art, and literature, and have strongly influenced the shaping of our national character.

"Wilderness is irreplaceable and must not all be lost. Inherent in its primeval character are recreational, scientific, educational, and historical values of great benefit to the Nation and its people."

Mt. Colden, Adirondacks—"wilderness is irreplaceable and must not all be lost"

Launching sites are woefully inadequate to meet the demand

Under the Bond Act, the Department will acquire lands to consolidate the State's wilderness and provide better approach to existing areas. Almost 200,000 additional acres are the goal within the Adirondack and Catskill Forest Preserves. About 20,000 acres are already under contract.

Migratory waterfowl constitute a natural resource of international concern. The preservation of existing waterfowl habitat is vital to the future of many species. Some *wetlands*, where waterfowl are at home, are being drained while others are being filled for some form of development—commercial, industrial, agricultural or even residential. In New York State good waterfowl habitat still in private ownership is limited to about 37,000 acres. The Conservation Department, charged as it is with waterfowl management within the State, wants to acquire at least 35,000 acres.

Many wetlands contain high value waterfront; hence, the price comes high. However, because New Yorkers want to help insure North America a continued

New York has acquired 863 miles of public fishing rights

Wetlands are vital for wildlife and recreation

heritage of migratory game birds, they must do their part by preserving these last remaining waterfowl homes through public ownership.

Progress in weltands acquisition is slow to date due to the need for intensive surveys to determine "take lines." While actual signed agreements right now include only 1,727 acres, preliminary work is under way on more than 15,000 acres. Negotiations for a substantial number of these acres will undoubtedly be consummated by signed agreements within the next few months.

The *multiple-use* principle of wildlands management grows in importance as population increases and demands for products of all lands become greater. Under it, the several possible uses of land are carefully analyzed so as to coordinate them in the best public interest. Multiple-use does not mean that there will be several uses on every acre in an area.

For the area as a whole, timber management, for example, will be coordinated with wildlife habitat improvement, watershed protection and the many phases of outdoor recreation which can be applied to the area.

In the upland sections of New York there remain many privately-owned areas with multiple-use values. The Department hopes to acquire up to 122,000 acres of such land to manage for as many values as it will produce without harm to it. Agreements have been signed for more than 100 parcels, containing more than 12,000 acres.

Public *fishing rights* on major trout streams become more significant as more private owners post their lands against public use. The Conservation Department, aware of this trend in the late 1920's, began State acquisition of fishing rights in 1935. In the intervening 26 years, 863 miles have been acquired out of a total of more than 2,000 miles recommended for purchase. With changing land use and values, acquisition of fishing rights has become more difficult and expensive. The cost per mile has doubled in the past fifteen years. If the average fisherman is to enjoy trout fishing in New York State, fishing rights easements must be acquired now. The Department hopes to acquire an additional 400 miles under the Bond Act. Seventeen miles are already under purchase agreement.

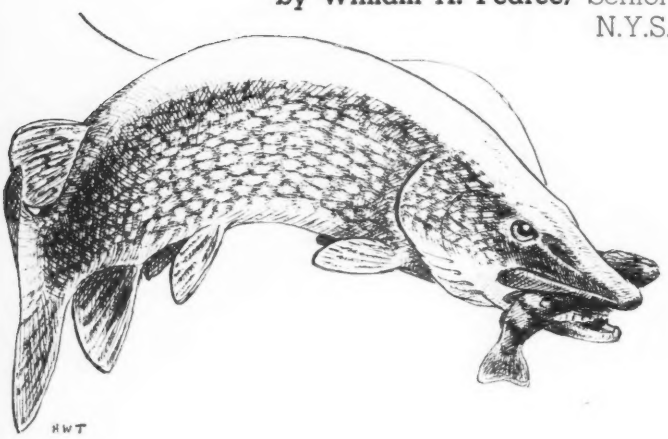
There are many other forms of outdoor recreation which require land in lesser degrees than do most of those described. Under the Special Use category for State lands other than parks, the Department includes lands such as building lots under acquisition for expansion of the Saratoga Spa, properties and facilities for training boys in outdoor recreation and conservation practices. Several agreements have been signed for special use parcels. Included is that for "Camp Intermission" on Lake Colby where both land and buildings are ideally suited to the development of a boys' conservation camp.

Conservation Commissioner H. G. Wilm, in commenting on the acquisition of State lands other than parks, has said: "Our goal is to complete, within a two-year period, as much as possible of the acquisition of State lands other than parks. With the exception of the surveyors and land appraisers employed specifically for the acquisition effort, our regular Department people are doing the job. And all the while, their other work must continue. They must continue the control of forest pests and fire, provide services to private forest owners, continue the many phases of research, maintain and develop recreational areas and discharge the many other responsibilities with which the Department is charged. They are doing it, too!"

Land acquisition under the Park and Recreation Land Acquisition Bond Act is in high gear. The Conservation Department will keep it going!

Fishing the St. Lawrence-T

by William A. Pearce, Senior Aquatic Biologist,
N.Y.S. Conservation Department



HOW cold is cold? Scientists will tell you that there is no such thing as cold; that it's simply a relative term. Well, misery is a relative term, too, as any ice fisherman will tell you—particularly one who has fished the upper St. Lawrence River in mid-January or February. Jack Frost and John Barleycorn constantly battle it out around most of the tip-ups scattered over the ice. Ask any of the many ardent fishermen, who trek there regularly to fish for northern pike or yellow perch, who the winner is. For those who can still talk, the nod goes to Jack Frost. But win, lose or draw, the ice fisherman is a hardy soul and that brings us to the reason for this article.

For years there has been much controversy about ice fishing as a factor in depleting a population of fish, such as northern pike. Many local and also some of the summer residents of the upper 45-mile section of the St. Lawrence River in New York State have argued that the winter fishing hurts the overall summer fishing success. Until recently there were no facts available to settle the argument one way or the other. Lack of facts did not, of course, deter the progress of the argument; it almost never does. But neither did it hold promise that light would be shed on the subject. To accomplish that, the Department's Watertown Fisheries Office undertook an intensive creel census of St. Lawrence River ice fishermen during the winters of 1958-59 and 1959-60. Our survey encompassed the area extending from Cape Vincent to Chippewa Bay, inclusive of the famous Thousand Islands section.

As additional stage setting and background, we might note that with the advent of more leisure time, better roads and cars, insulated clothing and larger pay checks, ice fishing has progressed from a local meat fisheries to an important sport fisheries. No longer does the population of this country hibernate during the winter months. Participation in winter sports has increased enormously in recent years. Ice fishing is no exception.

During the two winters of study, the creel census was carried out nearly every week end and also during many of the weekdays. The objective was to obtain necessary information on amount of fishing pressure, where the fishing pressure originated from and anglers' catch. We also wanted to find the sex ratio in the catch of northern pike being caught. For years it has been the belief of many people that in the latter part of the fishing season, (late winter) nearly all of the northern pike caught, were females. For that reason, as many fish as possible were sexed when checked to determine if a preponderance of females were actually being taken during late winter.

A brief description of the principal areas fished follows: It consists of many shallow, weedy bays along the shoreline, as well as waters around many of the islands. Much of it has always been ideal northern pike habitat. Unfortunately, relatively few of these areas are accessible by car. This is especially so in the late winter, when the snow becomes deep. Consequently, as the season progresses, the area available for fishing usually became less and less. In the early part of the season, right after freeze-up, fishermen drive out on the ice to fish. But as snow covers the ice, travel by car became impossible over much of the study area and fishing is restricted to short walking distances from the parking places. Most of the fishing is done in small bays near Clayton, in Goose Bay, located below the Alexandria Bay area, in Eel and South bays, located on Wellsely Island, and in Chippewa Bay, located near the Hamlet of Chippewa. There is no one hot spot. Some weeks the fish appear to bite more readily in one area than in the others, some weeks they will not bite at all and some weeks they seem to bite well, no matter what area is fished.

Now for a word about the ice fishermen themselves. Nearly all fishermen contacted—approximately 1,500 anglers during the two-winter period—were out to enjoy themselves. Naturally, they hoped to catch a prize-winning northern which was the predominant species fished for, but primarily they were out to break up the monotony of the winter. Many brought their wives and children along and stayed for two or three days—even a week—in the nearby hotels or cabins. Approximately two-thirds of the anglers checked were from distances well over 40 miles from the study area. The other third resided in the City of Watertown or in nearby small villages. It was interesting to note that the hardy anglers, the real dyed-in-the-wool ice fishermen, frequently came from considerable distances away. Very likely they figured that as long as they had driven so far, they would fish regardless of the weather and many did fish from daylight until dark. Little or no poor sportsmanship was noted among the fishermen. Actually, the ice fishermen were a much more sportsmanlike group than one would expect to find during the summer months.

Following is a brief summary of the actual catch taken by ice fishermen in the study area: A total of 1,281 anglers were checked for their catch. They had caught 673 legal northern pike, which averaged out to be about 8 hours of fishing per legal pike. They had also caught

Through the Ice

Typical ice fishing rig

approximately 5,000 yellow perch. Actually, many of the fishermen did not fish perch at all. Had they put their efforts into perch fishing, the catch of perch would have been much higher. Pike were caught at approximate ratios of 1 male to 2.4 females. The ratio in the early part of the winter fishing was 1 male to 2.5 females, and in the last month of the season, the ratio dropped off to 1 male to 2.3 females. This put to rest one argument, for now it is known that the ratio of females caught does not increase as the season progresses. Actually the ratio of females to males dropped off a little. The over-all number of females caught made up 70 per cent of the total pike catch checked. However, male pike averaged much smaller than the female pike and in the St. Lawernce River the legal size limit is 20 inches. Therefore, many sub-legal pike were released and not included in the catch record. It can be quite safely stated that a good share of the small pike released were probably male fish. If all pike caught, both sub-legal and legal, had been checked, the ratio of males to females would have been much closer to 1.1. Female pike ranged in length from 20″ to 36″, and averaged 25½″. Male pike ranged from 20″ to 29″ in length and averaged 23″.

Some interesting facts picked up during the study showed that the type of bait and the condition of the bait had considerable effect on the catch. It has been legal to use five tip-ups and two handlines, while ice fishing in the St. Lawrence River. Anglers with good bait usually caught more and bigger fish than anglers with poor bait. Some of the more ardent fishermen from out of town brought their own supply of bait with them, for it was found that quite often, as the season progressed, there was not a sufficient supply of good bait locally. Suckers, large chubs and golden shiners were the most common and the best bait used. Very few anglers used artificial jigs, although a good jig fisherman would probably have caught as many fish as the live bait fisherman.

A St. Lawrence Great Northern

Another interesting fact, which has been rather common knowledge to most ardent ice fishermen, was that fishing is best immediately after the first freeze-up. Even so, very few limit catches of pike were checked. In no instance was there any wholesale slaughter of pike as has been thought by many people in the past years. It is believed that ignorance of the actual catch in previous years has led to much erroneous information as to just what the ice fishermen are doing to the fisheries as a whole. One limiting factor on the St. Lawrence is difficulty of access. It is estimated that less than 5 per cent, and probably closer to only 1 per cent of the entire upper 45 miles of the St. Lawrence River, is accessible to ice fishermen. The remainder is difficult or impossible to get to because of lack of roads, heavy snow cover or even lack of ice. It was not found that fishing pressure, in general, was very heavy. The catch was too light to materially affect the over-all pike population in the study area. The number of tip-ups used seemed adequate to provide opportunity for a party of anglers to catch an occasional pike, yet preclude any monopoly of fishing area. Several of the anglers checked had little opportunity to fish during the summer months because of their occupations. They took time off during the slow winter months to get rid of their fishing fever.

From the results of this study, it was found that present regulations on ice fishing appear to be very satisfactory. The ice fishermen do not materially affect the over-all pike population in the area. There is very little violation of any kind present and it seemed to be an extremely healthy and enjoyable sport for all those who participated.

More exact information on this study can be obtained from the New York State Conservation Department, Region 4 Fisheries Office, at Watertown, free of charge. Request a copy of "The Upper St. Lawrence River Ice Fishery," reprint from the January, 1961 edition of the *New York State Fish and Game Journal.*

Mowed clearings in the National Forests enhance wildlife habitat.

The National Forests—

Your Own Hunting and Fishing Domain

A Discussion of the U.S. Forest Service's Expanding Wildlife Improvement Program Under Operation Outdoors, Part II

by Robert D. King, U. S. Forest Service

WILDLIFE on the National Forests and National Grasslands can look forward to some major home improvements in the years ahead. On the Allegheny National Forest in Pennsylvania, for example, there are a number of new openings in the woods where forage plants now grow abundantly. On the George Washington National Forest in Virginia there are checkdams and channel control structures along many creeks to provide better environment for trout. Ponds on the National Grasslands offer marshy areas, fenced to protect waterfowl habitat from livestock. Among tall, straight trees on National Forests are "worthless" hollow trees—den trees purposely left for squirrels, raccoons, and other forest creatures. These and similar improvements for wildlife can be found today on every National Forest and National Grassland. Such wildlife management projects are part of the job set forth in *Operation Outdoors, Part 2*—a ten- to fifteen-year program that will make the National Forests and National Grasslands not only a better home for wildlife, but a better hunting and fishing domain for sportsmen as well.

As implied in the title, this program is only part of the job of managing the National Forests; only part of a broad program for better management of *all* resources on these public lands—water, woods, wildlife, forage, and recreation. The program is popularly known as Operation Multiple Use. The companion piece, Part 1 of Operation Outdoors, is a five-year program to rehabilitate and expand National Forest recreation facilities—one might say—"Operation Better Housekeeping."

A recently published Forest Service booklet, "National Forest Wildlife," explains Operation Outdoors, Part 2—why we need it, what are its objectives and what we must do to accomplish them. What we have to say here covers briefly some of the highlights of this. The booklet is available upon request from the Forest Service, U.S. Department of Agriculture, Washington 25, D.C., or for sale for 25¢ from the Superintendent of Documents, Government Printing Office, Washington 25, D.C.

What are the National Forests and Grasslands?

The 155 National Forests and 18 National Grasslands are great reservoirs of natural resources. Their uses are many and their value to the American people is tremendous. Altogether they add up to 185 million acres in 41 states. They contain about one-third of the nation's standing sawtimber, 60 million acres of livestock range and much of the country's most valuable watershed lands. They offer some of the best in outdoor recreation—more than 5,100 camp and picnic sites, some 175 ski resorts, and a "feast" in magnificent scenery.

The forests, ranges, streams and lakes of the National Forest system also add up to one of the largest accessible systems of unposted hunting and fishing land in the country. They contain 81,000 miles of fishing streams and nearly 2 million acres of lakes. One-third of the big game animals in the United States make their home all or part of the year on the National Forests. This includes four-fifths of the moose, elk and grizzly bear and nearly two-thirds of the mule deer, black bear and bighorn sheep. Other game animals and birds are abundant, as are non-game animals. On the National Forests and Grasslands can be found practically every species of wildlife in the United States. No king of old ever had a hunting preserve to equal this vast domain open free to the American citizen.

Use of National Forest resources has grown tremendously in recent years and will continue to grow as the country becomes more industrialized and populous. Pressures are building up on all sides. Only intensive and skillful multiple use management can insure continued harmonious use of all resources.

Wildlife is a public resource. It has a recognized place in National Forest administration. It adds to the general public enjoyment of our National Forests. Of 92½ million recreation visits in 1960, 22 million were made by sportsmen. Hunter and fisherman visits to these public forests since 1949 have increased eight times faster than has the nationwide sale of hunting and fishing licenses. Surveys show that there is a hunter or fisherman in every third household, and that, collectively, they spend more than $3 billion a year for equipment and services.

Use and enjoyment of wildlife depends upon its continued abundance. And that abundance depends primarily upon the quality and quantity of habitat. Every animal has to have a certain type of environment—a habitat that will carry the animal population through the entire year. If a habitat lacks some basic need—food, water or shelter—then artificial stocking will not restore wildlife. But if the habitat is right, wildlife will survive and increase.

National Forest habitat is vital to im-

National Forest fishing streams—a major public resource

proving the wildlife resource. Virtually every acre of the National Forest system can support wildlife—and the abundance or lack of wildlife is almost certain to reflect the habitat quality. From sea-level swamps to alpine meadows the National Forests and National Grasslands can and should provide better homes for American wildlife.

Where We Stand

A look at the wildlife management situation as it now stands gives a good idea of the job ahead—a job requiring co-operation, co-ordination, and project planning.

State fish and game laws apply on National Forest lands. Thus, the several state fish and game departments and the Forest Service are partners. The Forest Service manages the land that produces the wildlife. The states protect and utilize the wildlife under individual state laws.

The state fish and game departments are expanding their wildlife activities in the National Forest system. They spend several million dollars on wildlife surveys, research and habitat improvement projects each year. Since these activities usually affect the protection, management, and use of National Forest lands, there is a growing need for the Forest Service to more fully co-ordinate its forest management activities with state wildlife programs.

Habitat conditions vary greatly on National Forests. Water, food and cover on some areas are sufficient to meet yearlong requirements of a high-level animal population; hence, it is not necessary to take further measures to increase carrying capacity. Management of these areas will insure that other uses do not unduly alter healthy habitat conditions. But there is substantial acreage in National Forests where wildlife habitat can be improved. Some of these low-producing areas are the result of logging, forest fires, or overgrazing by big game or livestock. Others are due to the natural development of vegetation types which are unproductive for wildlife. The Forest Service, through its experience in management of forest, range and watershed lands, has many opportunities to improve conditions for all kinds of wildlife. There are also opportunities to both protect and enhance the fishing on many streams and lakes.

Much of the essential big game winter range in the National Forest system needs improvement. On some ranges, forage plants are diminished to the point where both the game herds and the lands they use are adversely affected. In other places, deer and elk are damaging young trees needed for future timber crops. Although the general conditions are known, progress in restoring these ranges to a productive condition needs to be accelerated.

Many miles of National Forest streams are not at their potential fish production capacity. Intensive land use in some areas has resulted in excessive stream siltation, unstable channels and exposed and eroding banks. Improved fishing conditions will come about only through fully co-ordinated land management.

Additional personnel are needed to provide the leadership and training necessary if National Forest wildlife habitat management is to keep pace with the rising demand for public hunting and fishing areas and the states' wildlife management programs. Technical leadership in wildlife habitat management in the Forest Service has been provided by a few wildlife specialists. Theirs is an important task, for the wildlife job affects and is affected by all activities on the National Forests. If the guidance of wildlife specialists is lacking, much of the wildlife habitat could be seriously damaged by inadequate co-ordination of other land uses.

A welcome sign for sportsmen

A seeded, abandoned logging road

A fawn approves of its new world at one of the National Forests

Goals for Wildlife Management

In *Operation Outdoors, Part 2*, the Forest Service sets goals for itself to meet these recognized wildlife management needs. These fall in three major areas of activity: (1) Co-ordination of wildlife needs with all other National Forest uses; (2) co-operation with state fish and game departments in all wildlife development programs involving National Forest lands, and (3) improvement of wildlife habitat through direct development projects.

National Forests and Grasslands are managed under the multiple-use and sustained yield principles. Practically all areas serve more than one purpose or objective. Each of these land uses affects wildlife in one way or another. Some of the impacts are great; some are small. In turn, wildlife must be so managed as to maintain or improve other equally important forest resources. Under these circumstances co-ordination of uses and

interagency co-operation is essential to good wildlife habitat management.

Co-ordination, Co-operation

Timber sales create opportunities for wildlife habitat improvement. Selective cutting, or clear cutting in small blocks, opens dense timber stands. Food and cover plants are stimulated. To realize the greatest benefits to wildlife, adjustments are made in timber harvesting plans. Winter cutting may provide additional food on deer ranges during this critical period. Leaving small clumps of conifers provides shelter for wildlife; cutting in long narrow strips increases the amount of "edge" cover and food; and leaving mast and den trees in hardwood cuttings protects the habitat of squirrels and other small game.

Forest roads can be located in such a way that they will contribute to orderly harvest of fish and game through better distribution of hunters and fishermen. Roads should be located away from streams and meadows. They should be adequately drained to prevent damage to fishing waters; road edges, cut banks and fills can be seeded with soil-binding plants. Culverts should not interfere with fish movements.

In arid parts of the West, development of livestock watering places has extended the distribution of deer, turkey, grouse and quail. A fence around a seep or spring will protect the water supply and provide nesting and escape cover for song and game birds. Range seeding can be planned to improve habitat for wildlife as well as domestic livestock by including legumes, palatable browse and other important wildlife food plants in seeding mixtures.

This co-ordination is possible without impairing the other forest values—timber, grazing, water, scenery, recreation.

Basic to any program for wildlife management on the National Forests are co-operative surveys of conditions to determine deficiencies or limiting factors in the existing habitat. These state-Forest Service surveys classify the condition and trend of key wildlife ranges and waters; determine the production and utilization of food supplies; estimate the carrying capacity of wildlife habitats; and consider possible habitat improvements, whether attainable through co-ordination with other uses or through direct improvement projects. On the basis of these surveys, plans will be developed to accomplish orderly development of wildlife habitat.

The states will continue to finance many habitat improvement projects on National Forests. This is desirable and is encouraged. The Forest Service, in turn, has a responsibility to work with the states so that all non-federally financed habitat improvements are properly designed and located, and in harmony with the over-all management of the National Forest lands. This co-operation will include planning and engineering assistance and inspection.

Co-ordination, Co-operation Highlights

1. Administer and supervise wildlife habitat management activities with special emphasis on co-ordination with other National Forest resources. This includes:

(a)—Co-ordinating wildlife habitat requirements with timber, range, recreation, watershed, and other resource management activities; followup inspection to insure that wildlife habitat values are given proper consideration in all Forest Service activities.

(b)—Training of rangers and field personnel in wildlife habitat co-ordination methods and techniques.

(c)—Revising and completing wildlife habitat management and improvement plans for all administrative units, assuring proper co-ordination between wildlife habitat management and other resources.

2. Inventory and evaluate wildlife habitat resources in co-operation with other Federal agencies and with the states in which National Forests and Grasslands are located, as a basis for orderly development of wildlife habitat improvement and co-ordination programs. This includes:

(a)—Big game, game bird and small game habitat surveys and investigations on the 185 million acres of National Forest lands.

(b)—Fishery habitat surveys and investigations of the 81,000 miles of National Forest fishing streams and approximately two million acres of lakes and impoundments.

(c)—Participation in planning, inspection and control phases of all habitat improvement, land and water-use projects conducted on National Forest lands by states, other Federal agencies, and private groups to assure that projects will benefit wildlife and be in harmony with other resource values.

The estimated annual cost of the recurrent co-ordination, administration and co-operation work outlined above is $2,980,000.

Direct Habitat Improvement Projects

There are many opportunities for direct wildlife habitat improvement on the National Forests. Food and cover deficiencies can often be improved by breaking up brushfields, creating clearings, planting desirable food and cover plants, fencing stream bottoms and developing marshlands. Where water supplies are deficient or poorly distributed additional water can often be developed by building ponds, developing seeps and springs, drilling wells, or installing "guzzlers."

Project Highlights

Wildlife habitat improvement projects involving direct management of food and cover to improve key wildlife areas that will not be fully developed through other resource management activities:

(a)—Improve food and cover on 1.5 million acres of game range by direct revegetation of shrubs, grasses, and herbaceous plants.

(b)—Develop wildlife openings, food patches, and game ways in dense revegetation by clearing or controlled burning on 400,000 acres.

(c)—Improve 7,000 miles of fishing streams and 56,000 acres of lakes by stabilizing banks, planting streamside cover and constructing channel improvements.

The total estimated cost of direct improvement projects for the short-term 10- to 15-year period of the National Forest program is $25,600,000.

In the Long Run— the Greatest Good

Fifteen years from now, when the results of this program will be paying dividends, the National Forests and National Grasslands should provide America's wildlife with better habitats. Hunters and fishermen may increase their number, yet they will still enjoy good hunting and fishing. Those who enjoy the sights and sounds of nature will find a healthy community of life on the National Forests.

Wildlife is but a part of the Operation Multiple Use program. Management of all natural resources on the National Forests and Grasslands is to be greatly intensified. The woods will yield greatly increased crops of timber. Improved watershed management will give farms and cities more dependable supplies of water. Forage on National Forest rangelands will continue to support healthy cattle and sheep. Millions of Americans will continue to camp, picnic, ski and swim in the National Forests.

Operation Multiple Use looks ahead to the demands of the future with confidence. It charts a course by which these public lands will always serve the public with ever-renewing resources—water, wood, forage, wildlife and recreation. The original guiding principle of National Forest administration remains in effect, now and always—the greatest good to the greatest number in the long run.

The Adirondack Museum—

—An Institution With Exc

Entering the main building

Relief map greets visitors

Reference library

THE Adirondack Museum, at Blue Mountain Lake, revisited, can be just as interesting as the initial call. There is the satisfaction of again viewing the objects of Adirondackiana coupled with the bonus that comes of noting the additional memorabilia—all that mirror the past of the region.

Having been in on the initiation of the idea (see CONSERVATIONIST, June-July, 1949), the preliminaries to its opening (December-January, 1955-56 issue) and its dedication (December-January, 1957-58 issue), we can speak with authority and with more than passing interest of this institution which is preserving a way of life that otherwise would be scattered and lost with the passage of time. To review but briefly, to acquaint those who yet have to visit the Museum, and to refresh the memory of those who have included it in their sightseeing:

The Museum stands on the site of the old Blue Mountain House, on the side of Blue Mountain at 2,000 feet elevation, 200 feet above the lake—where the lakes, mountains and sky comprise an outstanding panorama.

Tyler Merwin, a New England farm boy, came to the Adirondacks to learn the lumbering business in the mills at Glens Falls and then went to Blue Mountain Lake where his father had purchased a tract of land for lumbering. He erected the proverbial log buildings—a house for the workmen, a barn and a mill further down the road. Connecticut's Governor Coffin and son found the logging camp an ideal vacationing spot. Result, a small cabin was built, the forerunner of the Blue Mountain House. In 1876, Merwin built a new log cabin, overlooking the lake, a home for his bride.

Fire destroyed the first buildings but other buildings were erected and a flourishing hotel business ensued, with the real Blue Mountain House being built on the site of the present Museum. Mr. Merwin carried on the business until 1935 when he sold the property to William L. Wessels. The Wessels developed the business. Mrs. Wessels was the gracious hostess. Mr. Wessels pursued his hobby of collecting old prints and other Adirondack lore and nurtured the idea of organizing an Adirondack Historical Association, which came into being with him as its first president. Land in the Village of Blue Mountain was purchased and plans drawn for a Museum. World War II and the Korean War interrupted and plans lay dormant. Mr. Wessels retired from the hotel business in 1954. Harold K. Hochschild succeeded him as Association head; the Association bought the Blue Mountain House and erection of the Museum was begun in 1955.

When the Museum opened in 1957, there were nine points of interest in addition to the fieldstone Museum building. Now, in addition to the Main Building, there are thirteen. Let's take the tour:

On going into the entrance hall of the Main Building you will see a large relief map of the area. To the left, a gallery with period photographs, drawings and paintings; to the right, a gallery housing a series of dioramas illustrating early logging techniques, historical events and ways of life in the Adirondacks; thence to the Log Cabin (built in 1876 as an auxiliary to Merwin's Blue Mountain House)—in the rear of this Log Cabin is the Little Gallery (new) where changing exhibitions of art and photography will be shown.

The Adirondack Cottage, a camp of the 1900 period, and the Railroad Station, with its locomotive and one car of the shortest standard gauge railroad in the world, are old friends. And next, familiar to us, but an addition, looms—the Hermit's Camp, where Noah John Rondeau, the Adirondack hermit of Cold River (see October-November, 1946) lived for many years.

New since we last were at the Museum is the Private Railroad Car, a rare, surviving example of the Victorian luxury in which the wealthy summer residents made the rail journeys around the turn of the century between their city homes and their Adirondack camps. Behind the car, cleverly built into the overhanging shed that shelters the car, is the Aquarium, displaying native and introduced species of living fish of the Adirondacks.

The Boat Pond, exemplifying three phases of boating—the private steam launch, the gasoline launch tender and the gasoline speedboat—comes next; then the Vehicle Buildings with their assortment of vehicles recalling various summer and winter modes of transportation. Full-size logging equipment similar to that shown in the dioramas, and river drive boats, snow plow and other logging equipment come into view along

-Revisited

by Roland B. Miller

Exciting and Everchanging Display of Adirondackiana

Diorama gallery

Sprinkler wagon diorama

with something new and a wry grin provoker to those familiar with the old days—a "two-holer" (oh, yes, an object d'art and very important to the life and times so fully covered by the Museum).

Nor is much lacking in the Longhouse with its profusion of small objects—hunting and fishing gear, ice tools, lamps, etc. Nor in the variety of stoves in the Stoves Building. Along with the guide-boats in the Guide-boats Building have been gathered other small craft to give a well rounded view of small boating in the Adirondacks.

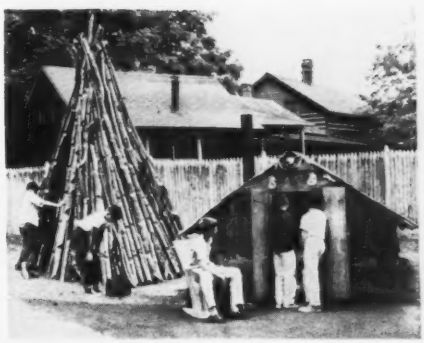
For the researcher, the library in the Main Building is a treasurehouse fast becoming organized, catalogued and microfilmed, and already publishing.

Incidentally, it is expected that the recent underwater discoveries of Colonial and Revolutionary significance will find their way into the Museum.

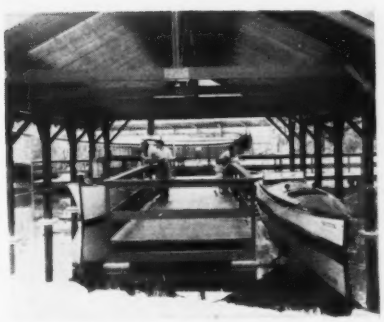
Yes, the Adirondack Museum at Blue Mountain Lake should be revisited. Memorabilia continues to come out of hiding to find its way to this State-chartered, non-profit educational institution—a so much more worthwhile place for the vacationing and touring public to visit than the commercial attractions with which it must compete. No one should plan to spend less than a couple of hours in seeing the exhibitions.

The Museum is open from June 15 to October 15, so another successful season has just closed. It was really a privilege to revisit it. We hope others will pass through its entrance building and spend a profitable time there.

An 1890 railroad car



Hermit Rondeau's camp



The boat pond

Vehicle building

Our Stake in the Great Lakes Fisheries

by Dr. John R. Greeley,
Chief Aquatic Biologist,
N.Y.S. Conservation Department

IT'S difficult for folks seeking outdoor recreation here in New York State to feel cooped up—particularly the fisherman. With literally thousands of inland lakes and ponds, even more thousands of miles of rivers and streams, plus some 600 miles of ocean, sound and bay shoreline in our marine district, the problem is not where to wet a line, but how to manage time to get around to all this fishing opportunity.

But should you, despite this wealth of fishing opportunity, feel claustrophobia setting in, just set your course north and west to the waters of Lakes Erie and Ontario. Here on our interstate and international boundaries lies our greatest fresh-water bonanza—more than 2½ million acres; New York's share of these magnificent lakes. Nor does this take account of the Niagara and the St. Lawrence rivers or all the bays, creek mouths and marshes which are integral parts if we are to consider the total fisheries resources of Lakes Erie and Ontario.

The actual importance of this large acreage in producing recreational and commercial fishing is tremendous; the potential importance even greater. To transform potentiality into actuality is the principal objective of the fish management program for these waters. Perhaps the brightest existent aspect is the outstanding black bass fishery of the eastern Lake Ontario-St. Lawrence River area, but the shallows from our Lake Erie border on the west to the Thousand Islands and the St. Lawrence River on the east presents every fishing opportunity from inshore smelt dipping to offshore gill net fishing. And the species include everything from alewives to zebra darters (although we had to dig up an obsolete name for the log perch to get that z).

Administratively, New York has regulative authority for the fisheries within our territorial parts of Lakes Erie and Ontario, but each lake is a unit as regards many fish problems. This necessitates co-ordinated action with similar agencies bordering these waters. In the Lake Ontario basin (including lower Niagara River and upper St. Lawrence River) the Province of Ontario is the other administrative agency. In the Lake Erie basin (including upper Niagara River) we have the Province of Ontario and the States of Pennsylvania, Ohio and Michigan represented. Add to these the U. S. Fish and Wildlife Service which, through its research program, has contributed much toward solution of Great Lakes' fisheries problems. Growing out of such interagency contacts over a long period of years, a Lake Erie Fish Management Committee and a similar Lake Ontario committee have evolved, providing a means for improved co-ordination by all hands.

On an international scale there is a Great Lakes Fishery Commission, established by convention between Canada and the United States for the conservation of Great Lakes' fishery resources. The two major responsibilities of this body are to develop co-ordinated programs of research on the Great Lakes and, on the basis of findings, to recommend such actions as will insure the maximum sustained productivity of stocks of fish of common concern. An important phase of the Commission's program has been the formulation and implementation of a program to eradicate or minimize sea lamprey populations in the Great Lakes.

The present condition of the fishery in the New York waters of the Lake Erie and the Lake Ontario basins has some favorable aspects, and some not so favorable. In the sports fisheries, the smallmouth bass of the Ontario-St. Lawrence area have provided a relatively stable fishery; unusually so as these things go. The Lake Erie bass fishing has been reported excellent recently. The upper Niagara River muskalonge fishing has been another bright spot, and the devotees of smelt dipping have had a carnival over a wide range of waters. Perch fishing has been generally good.

Lake Erie, the most productive of the Great Lakes, has remained full of various fish, but there have been unusual changes in the composition of its fish population. It is true that the past history of this lake has shown wide fluctuations but the recent situation is unusual in the vast, recent build up of smelt, not a native species. Alewives, another non-native fish, have also increased. Physical changes in the lake have also been demonstrated to have taken place. The sea lamprey, present in small numbers, has not been considered a major factor here.

Whatever the complex of factors, the present fish population in Lake Erie is highly unfavorable to the New York commercial gill net fishery, which, in years past, yielded whitefish, blue pike, yellow pike, ciscoes (in some years) and yellow perch. There are still plenty of perch but the market price is not conducive to gill net fishing.

The Lake Erie commercial fisheries face a major revolution in that the development of a special fishery for smelt, which currently are in great abundance, requires expensive conversion of boats to trawling; also requires special handling and processing. Population sampling of other fish has not been encouraging. There are some yellow pike of the 1959 age class but with older ones scarce. Blue pike have shown no large age classes in recent years. Going into the lower grades of fish, such as the sheepshead, there are possibilities for developing use for the animal food market, but this presents difficulties because a large, reasonably steady quantity must be marketed at a low cost per pound.

Lake Ontario, too deep for fish production in a large area of New York waters, has shown less striking changes, but here too, introduced fish must be

considered as a possible factor. Here, too, smelt have increased, as have white perch. Except for a relatively productive inshore trap net fishery in the Chaumont Bay area for bullheads and mixed shallow-water species, there has long been a minimum of commercial fishing in Lake Ontario waters.

An experimental program of lake trout stocking carried on co-operatively between New York and the Province of Ontario since 1953 has produced encouraging results in survival and rapid growth of lake trout. A key point, however, still remaining to be determined, is the success of natural reproduction, long at a low level. This lake is too large for lake trout management by stocking alone. Within a few years it may be possible to determine whether or not stocked lake trout will survive to adult numbers and whether they will reproduce adequately to maintain lake trout fishing, which at times in the past has been important both commercially and for angling. Small scale trial of Atlantic salmon in Lake Ontario has produced a few recoveries demonstrating rapid growth rate but the expense of expanding the stocking of this species would appear to be a poor gamble.

There are indications that the over-all Lake Ontario fish situation is in general encouraging. This lake has commonly had an annual die-off of stunted alewives (locally known as "moon-eyes") a source of considerable nuisance along the beaches. This nuisance appears to have greatly decreased indicating a probably decrease in the one-time top-heavy population of this species. As to the sea lamprey, whatever its effects in Lake Ontario, it has been there a long time; perhaps was a native inhabitant.

By now, if you feel the fish problems of the Lake Erie-Lake Ontario areas seem complex and confusing—well you're in the same boat with the fishery biologists. They are confused by it also. Without highly effective methods for sampling fish populations and determining the ecological inter-relationships of the fish and other organisms, it is difficult to determine the changes exactly or to make exact interpretations of why these various changes occur.

Biologists do recognize the nature and probable solution of some of the problems. In addition to preventing environmental damage, as for example by control of pollution, the most constructive lines of approach seem to be to work toward better quality and greater stability of the fishery.

These waters will produce fish, Lake Erie more so than Lake Ontario. Such fish are in competition among themselves and, if low quality or unutilizable species predominate, the fisheries will suffer. Expansion of the utilization of one type of fish may be assumed to affect the numbers of others, even though it may be impossible to call our shots exactly as to what population changes an expanded fishery will cause. The Chaumont Bay area trap net fishery in the eastern part of Lake Ontario is an example of what may be one of the best and most practical methods for black bass management, since it tends to "thin out" competitors. We might well consider that efforts to expand the taking of some presently unutilized fish in both the Lake Erie and Lake Ontario basin might pay off in improving the quality of the fish production. The big problem here is how to assure that such an operation will be economically feasible.

Drying the nets

Commercial catch of yellow perch

Good Snow's Hotel at Henderson Harbor, Lake Ontario —a Mecca for sportsmen, guides in the good old days

To come to the objective of greater stability, a steadier yield would be a boon to both angler and commercial fishermen. Markets do not like the "feast or famine" yields characteristic of many commercial fisheries, and the sportsman does not like to see the bottom drop out of his favorite type of angling fish even though perhaps some other species may be plentiful. Both of these lakes have had their ups and downs. If ways can be found to obtain greater stability, prolong the "ups"—minimize the "downs," we will have taken a long step forward in fisheries management in the Great Lakes.

Even if efforts to stabilize Great Lakes' fisheries should fail, at least it may be useful to predict the future fish crop; a relatively easy thing to do if effective population sampling and year class determination (by scale reading) is provided. This alone would justify a more intensive research program than has hitherto been carried on in these areas.

Another practical consideration is that some efforts to "manage" will in any event be made. If these are not truly management, based on accurate facts, they will unavoidably be mismanagement, based on guesswork, opinions and pressures. In the past the Great Lakes have had more than their share of guesswork and pressure management. The evolution of a sounder plan is much to be desired.

The New York State area of these waters, well over 2½ million acres, provides a challenging field for research and management effort with possibilities of worth while rewards in the form of a greater sustained yield to both the angler and the commercial fisheries.

Big Moose and the F.W.M.A.*

by Anne LaBastille Bowes

This article by Anne LaBastille Bowes is indicative of the flexibility of the Fish and Wildlife Management Act as a framework within which property owners, sportsmen and the Conservation Department can work to provide public hunting opportunity and, at the same time, solve trespass problems.

Big Moose is unique among the F.W.M.A. areas established thus far, for it does not in itself offer new hunting lands. Rather, it provides access for sportsmen to existent State lands heretofore available to them only through trespass across private property.

We are sure that the Big Moose "key" will fit similar situations to unlock doors to hunting opportunity while easing landowner-sportsmen tensions.—Editor

A rifle crack shattered the December dusk. The report vibrated over the lonely hills around Big Moose Lake. It was the last day of hunting season, 1959. On the cold, still air, that shot sounded the finale to a series of staggering hunting season misdemeanors. In a stroke, it brought to a head the mounting indignation of local property owners, hunters and conservation officers. Ironically, it also heralded the start of co-operative work between Conservation Department and landowners in the Big Moose area to solve hunting problems through means of the new Fish and Wildlife Management Act.

Residents were hopping mad. Every Big Mooser was tired and "edgy" from trying long and usually unsuccessfully to protect his rights and his property from irresponsible and inconsistent hunters. Black and white posted signs had been rudely ignored or torn down. Vacant camps were burglarized. A woman, living alone on the lakeshore, reported her woodshed stripped and a bullet hole through the kitchen window. A hotel owner trembled with rage remembering the carload of hunters who chased a bear onto his lawn; then demanded to shoot it. He needed an axe and courage to make them retreat. An elderly couple, who fondly fed half a dozen deer all year, wept when two of their "pets" were shot within yards of the Big Moose road.

Sportsmen, in turn, felt thwarted and cheated by the network of posters which barred them from hunting opportunity. Game was to be had, and in some cases, public land lay but a few yards behind private posted property. Only those paper squares prevented access to the vast Forest Preserve behind and the wild herds in need of harvest. In desperation, many sportsmen trespassed on foot or cruised roads for tame deer.

Special Game Protector Leo Minnie, employed by the property owners, was exhausted and discouraged like many another game official that last night. The 37-day shooting season had produced 27 arrests with fines totaling close to $1,000. He had confiscated 12 does and fawns; saw again as many rotting in the woods. Each violation meant a personal visit to the property owner in question, the formal signing of a complaint, and a trip to the justice 20 miles away. Few hunters were courteous or honest with Mr. Minnie and the residents were stubborn and prejudiced against them. Often, there were threats. "I'll burn your camp down!" "Get out before I shoot you, you poacher." "We'll be back, mister!" As a game protector, Leo Minnie found he was half public relations man, half policeman.

At Big Moose, therefore, there were three disgusted groups—the landowners, the hunters and the enforcement officials. Actually, there were four, because the Conservation Department's wildlife biologists knew that for every tame deer shot along the roadside there were half a dozen wild cousins back in the bush who needed harvesting. With winter kill and range deterioration paramount problems in the mountains, it's necessary to balance the herds with their food supply. Otherwise, the animals suffer disease and mass starvation. Biologists count on hunters to help control deer populations. They depend on them to thin down the deer so that both animals and land will benefit. This is sound game management.

Thus, the four groups—residents, sportsmen, officials and scientists—have taken their stand, expecting privacy, recreation, integrity and control, respectively. The Big Moose situation is far from unique. Its tensions and problems are repeated throughout America as the ris-

**Fish and Wildlife Management Act.*

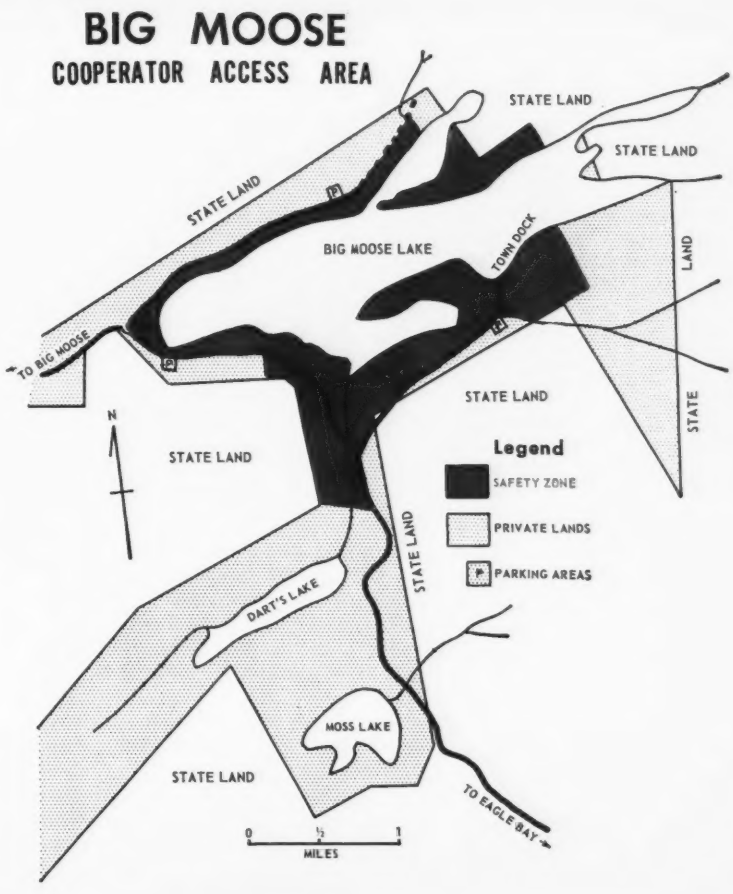
The author lends a hand at posting

ing number of eager hunters is counterbalanced by a growing group of irate landowners. Relations are strained and tactics often border on guerilla warfare. So little rapport exists that many a sportsman finds open, huntable land only by willfully defying local restrictions and State laws. In retaliation, property holders post more and more signs, cutting down on accessible land. The vicious cycle spins on.

One might not think the Adirondack Mountains with their vast reaches of Forest Preserve, would share this predicament. Ringed by crowded cities (Albany, Montreal, Potsdam, Ogdensburg, Watertown, Rochester, Syracuse, Utica, etc.), they're a natural target for a large percentage of New York State's 500,000 big game hunters. They are drawn here by the abundant and varied wildlife, the convenient hostelries and shops, the two and a quarter million acres of public land. Sounds like room and sport for all!

Once inside the Blue Line (the Park boundary), however, things change. Here, fear and laziness dictate hunting pressure and pattern. The average sportsman looks at those miles of rugged wilderness and decides to hug the beaten path. Few go "back in" more than a mile or two. Along the roads, of course, the hunter is denied entrance to private land, and often, to the public preserve behind. Tension mounts. Where to hunt?

To correct this serious impasse, New York State recently enacted the *Fish and Wildlife Management Act*. It's an astute and comprehensive program designed to improve and increase fishing and hunting opportunities on private lands. By co-operating directly with the private landowner, our Conservation Department now has legal means to manage wildlife and sportsmen on private property.



Sportsmen found access; landowners, protection

This plan operates strictly on a give-and-take basis, with the Department acting as a go-between. Landowner and huntsman are *both* catered to; yet, need relinquish few privileges. The landowners receive "safety zone" protection for their buildings, crops, and land. They reciprocate by opening up part of their previously-posted property. Hunters respect the restricted areas and show courtesy to residents. They, in turn, are facilitated in their quest for wild game on public land with signs, maps, access trails and parking lots.

How does such an idealistic plan work out? Let's take a look at Big Moose Lake, site of one of the co-operative, multiple-owner F.W.M.A. areas in the Adirondacks. The program at Big Moose has been running for two hunting seasons; roughly one year and two months.

So far, it's been a success story of modern, intelligent, psychological conservation-in-action.

In the late summer of 1960, prior to the hunting season, the Big Moose Property Owners' Association, Inc. held its annual meeting. Many members made bitter comments about hunters, the 1959 deer season, and the Conservation Department itself. They did not intend to tolerate the violation of property rights nor be subjected to personal abuse. Big Moose policy has always been to act *before* damage is done by intercepting potential violators and directing them to public trails and the Forest Preserve. To achieve this end, Special Game Protector Leo Minnie has been engaged during several seasons for patrol and public relations work. Despite this liberal policy, Minnie's expert vigilance and the alert assistance of most residents, troublesome incidents increased and arrests mounted. That December, 1959, night's jacking episode was the last straw.

The Association considered forming a sanctuary under the auspices of the Big Moose Fish and Game Club, but cost of posters, labor and especially lack of legal power offered too large a stumbling block.

Confidently, the author approached the Conservation Department in Albany, hoping wildlife authorities could suggest some workable system whereby personal and property rights might be protected, while hunters would be channeled to State lands where deer hunting was necessary and permissible. The newly enacted Fish and Wildlife Management Act appeared to offer the solution.

Department wildlife Biologists, C. W. Severinghaus and Anthony Taormina, came to Big Moose in September, 1960. After inspecting the area, they found approximately 1,200 acres of land which qualified for restricted "safety zone" under the F.W.M.A. plan. This crescent-shaped zone, embracing two-thirds of the four-mile lake, was surrounded by the Big Moose road and beyond by Forest Preserve. Thus, patrol and hunter access was ensured. With the posted signs down, this opened up much Forest Preserve land previously unnoticed and unaccessible to the sportsman.

As nearly 100 residents had already given written permission and approval for a sanctuary, the conservation men found fine support and enthusiasm for the F.W.M.A. plan. Folks were ready to try any measure that might ease the touchy situation. A public meeting was called. The plan received a unanimous vote with full support of the Big Moose Fish and Game Club. Papers were drawn up at once and signed, with E. Winslow Kane, President of the Property Owners' Association, Inc., acting as liaison between residents and the Department. The contract would run for one year and be automatically renewed if all were satisfied.

ENTERING Big Moose Cooperative
F.W.M.A. SAFETY ZONE Area
4 Points of Access to State Lands
Public Parking Lots + Dock Maps Avail al

Hunters' guide map at Big Moose

Establishment of the F.W.M.A. Area was a whirlwind affair. Big Moosers were anxious to receive 1960 hunting season protection and less than three weeks remained until opening day. Large-scale activities were shared by residents and conservation men. The entire lakeshore, roadside and forest surrounding restricted areas were stripped of old posted signs and replaced with the F.W.M.A.'s special yellow safety zone posters. As these were erected, property owners signed a power-of-attorney, giving full legal authority to the Department and its employees to prosecute violators of the F.W.M.A. safety zone. At last, a plan with teeth in it!

Three public parking lots were developed by the Department, providing space for 35 to 45 cars. These lots lay on private holdings, but co-operating owners allowed construction. They realized this would end the old problem of scattered, careless roadside parking, blocked driveways, ditched cars and littering. From each lot, State land was easily reached. Free maps and a large orientation board indicated the way, and all main trails were cleared and well marked.

Out on the main road, two colorful signboards informed and warned sportsmen of the F.W.M.A. Area, directed them to parking lots and State land, and gave bearings with a map. No excuse for trespass now!

Folks finished work just in time for shooting season. Then, they settled back to wait and see.

A rifle crack again shattered an evening's hush over Big Moose Lake towards the end of 1960's deer season. Leo Minnie wasn't too surprised. He hadn't expected miracles overnight, but he *was* impressed at the effectiveness of the F.W.M.A. plan. That last shot meant his eleventh arrest at the end of a 42-day shooting season. Fines only came to $365 and confiscations totaled two. Quite an improvement from the previous year with its 27 arrests, $1,000 in fines and twelve confiscations! There had been more hunters than ever before in the woods, too. The best part, thought Mr. Minnie, was that he no longer had to laboriously seek out every property owner on whose land a violation occurred and have him sign a complaint. Now, he had legal authority from the whole group to apprehend the game criminal and whisk him away to the judge without delay. Each crime was against *all* landowners, not a lone individual.

Furthermore, Protector Minnie had noticed that many hunters made courteous inquiry as to the best routes to State land. The bright yellow safety zone signs, plus billboard maps, caused considerable favorable comment and helped sportsmen stay on "the straight and narrow."

When the 1961 Property Owners' Association meeting rolled around this summer, there was an optimistic attitude towards the Conservation Department and the F.W.M.A. plan. Few residents reported trespass, damage or annoyance since hunters had been channeled to the new parking lots and thence to public lands. Everyone agreed to let the contract renew itself automatically for another year. Six landowners who had abstained in 1960 now wished to join.

As Mr. Minnie expressed it in his report, "A continuation of Conservation Department co-operation together with adequate patrol should prove of great help to hunters entering our area, keep down violations and build up the tame summer deer population for the enjoyment of winter and summer Big Moose Lake residents."

There appears to be a solution to the cat-and-dog battle of Landowner vs. Sportsman. They may never become bosom pals—there are too many years of poor relations and disagreeable incidents to be quickly forgotten—but, the Fish and Wildlife Management Act *is* a step in the right direction. We're proving it at Big Moose. Our first season as an F.W.M.A. access area showed a distinct improvement in hunter conduct plus a lessening of property owner resentment. Perhaps, with continued co-operation and education, we'll find that "happy hunting ground."

The Case of the Blue Carp

by Howard A. Loeb,
Conservation Biologist,
N. Y. S. Conservation Department

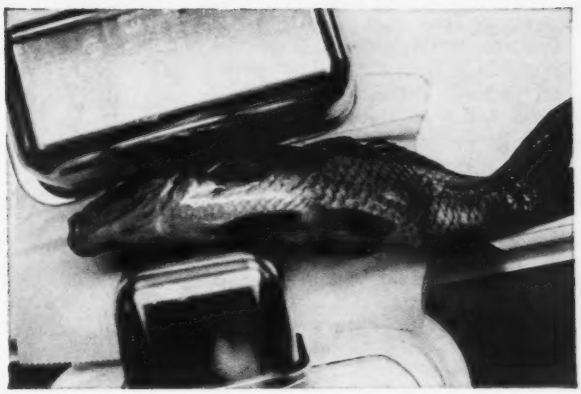
THIS is not the story of a morose fish, which, confronted by adversities in its watery world, has retired dejectedly to brood upon the vicissitudes of life. Rather, it is a brief report on one of the research projects under way at the Conservation Department's Fish Laboratory at Livingston Manor to mark fish by dyeing them in abnormal hues so they may be identified later.

The process of coloring fish brown, red — or in this case, blue — is a relatively new research and management technique employed by fisheries biologists. It is accomplished — as circumstances dictate — by providing dye-infused food; by injecting the dye directly or by dipping the fish in solutions of the dye. We are employing these techniques here at the DeBruce Laboratory as an assist in the conduct of our major research work — the development of poisoned baits, specific for carp, that may be used to control populations of this species where they pose a fish management problem in various parts of our waters. This is one of the research projects being carried out with Federal Aid funds. The technique of dyeing provides an easy yet effective way to mark large numbers of fish (in this case carp) to determine how many of known numbers of fish will pick up poisoned baits, and how effective these baits are, in experimentally treated areas.

External coloring of fish has been little used until recently because other tools, all constantly being improved, seemed adequate for the problems at hand. At present, breeding fish are branded and tattooed, trout are finclipped, assorted fish are labeled with subdermal latex injections and thousands of fish of dozens of species swim the seas, rivers and lakes with tags attached. (For excellent descriptions of tagging and its use see CONSERVATIONIST, J.-J., 1955 and 1960).

But all of these methods have disadvantages; tags fall off, fins regenerate, tattooing is difficult, and so on. Coloring is no exception because non-toxic, fast dyes are uncommon. Nevertheless, dyes are useful mass production tools if the identification of individual fish is unnecessary. Brightly colored fish are easily recognized, and in addition, previously unmarkable forms become identifiable. These include fish fry, crustaceans, starfish and (when dyes are fed) fish in their natural habitats.

A dye is a chemical that has color.



For example, the formula of Pontamine Fast Pink BL, one of the dyes used effectively, is "sodium salt of 3:3-disulphodiphenylurea-4" 4-disazo-bis-2-amino-8-napthanol-6-sulphonic acid." Each dye has its chemical and physical characteristics; it might be a powder or liquid, soluble or insoluble in water; toxic or not. The U. S. Food and Drug Administration has certified certain dyes for use in food, drugs and in cosmetics, but most are barred because of their actual or unknown toxic properties. The biologist, however, is interested initially in the coloring properties; toxicity can be determined later.

Most dyes will not color fish. Those that do fall into two arbitrary classes— dispersal dyes which color the entire animal, and those that produce local marks. Dispersal dyes applied by injection, feeding and dipping are preferable because the animal is most easily recognized. Local dyes are injected but this method is difficult because only fleshy and usually light colored areas of the fishes' anatomy can be utilized.

Some fair local marks have been produced by various workers. Among the dyes that have been used, with lengths of time during which the induced coloration is recognizable are: India ink, six weeks; cadmium sulfide, mercuric sulfide and carbon black, 18 months; Bates Numbering Machine Ink (in crayfish), for one growing season; brilliant vital red, alizarin red S, Congo red and nigrosine, a few weeks to three months. Many other dyes produce local marks but also destroy tissue or kill the fish.

Four water soluble dyes color the entire fish when injected into the body

(*Continued on page* 32)

Footnote: This article is based on studies conducted by the Conservation Department under the Federal Aid in Fish and Wildlife Restoration Program.

"The Charmed White Deer"*

by Nessmuk

In THE CONSERVATIONIST *for December-January, 1950-51, we published a short biography by Dan Brenan about an "outdoorsman, hunter, angler, canoeist, poet, philosopher, writer supreme on woodcraft lore—", born George Washington Sears, but known to all—particularly among the people of his beloved Adirondacks—by his pen name, "Nessmuk." Here, courtesy once again of Dan Brenan, is a whimsical sample of Nessmuk's writings from the old periodical,* Forest & Stream.—*Editor*

THE article on white deer has more of interest to an old woodsman than you might think.

Few, very few men, are aware of the strong undercurrent of superstition which permeated the whole being of many an old, courageous, hard-headed hunter, sensible in all else.

Within two miles of where I write lived O.W., a sturdy New Hampshire Hercules who came here when land was sold at 25 cents per acre. He cleared up and "made" three farms and was a noted hunter. His word was good as gold wherever he was known. He was as witty as Hood, fairly educated for the times, and a man among men. For many years he was obliged to go sixty miles with a bushel of wheat on his back, to Williamsport, to get bread for his family. Year after year he averaged over seventy deer per annum with his old, long-barreled Lancaster rifle, not to mention an incidental bear or panther now and then. And this man believed that his rifle could become utterly useless through being bewitched.

One day, in his presence, I was ridiculing superstition to the best of my ability when I noticed that old Oliver sat still and quiet, with an expression on his weatherbeaten face such as one sees on a white oak knurl. When we were alone the old man opened about thus:

"Young man, mebbe you are right, but there may be some things we do not understand. You ought to know whether I am a shot with the rifle or no. Now how do you account for a thing like this? One day, in November, 1820, I was out on a light trackin' snow in the South Woods. Half a mile from home I had a fair shot at a buck ten rods off. The buck gave me a look and walked off. In less than an hour I had another fair shot—not a twig in the way—and never knew where the ball went. Before noon I got the third shot—big buck, seven rods or so away—and I missed again. Then I went home. There was a squirrel on the roof of the corn crib. I hauled up and knocked his head clean off at seven rods. How do you account for it?"

"I don't account for it. What did you do?"

"Tell you what I did. Started that afternoon for Auntie Johnson's on Pine Creek, twenty miles away. She unbritched the rifle, cleaned it out and greased it with something and tied three red strings 'round it. Then she made me a silver bullet and loaded the gun. Told me not to shoot until I got a fair shot and could make sure. If I found the ball in the deer I was to set my compass and throw the ball as far as I could to the East."

"And did you do it?"

"Yes, I did. I killed a buck with that bullet and didn't miss another deer that season."

"What did the old lady charge you for her incantations?"

"Charged me three dollars. It was cheap. Kept me overnight, and I killed about eighty deer that season. Venison wasn't worth much. I gave a saddle and skin of a big buck for twenty pounds of pork and was glad to make the trade. Yes, pork and bread was mighty scarce. Game was plenty."

"Did it occur to you that the old lady might have run a pewter ball on you?"

The old hunter was disgusted. He seized his cane and marched off without a word.

Old Oliver joined farms with a man named Joel Culver. They came in here together about 1805; were hunting "pardners," neighbors and friends all their lives. Joel was a college-bred man. He was witty, cynical and skeptical. I thought the superstition of his old neigh-

(*Continued on page* 34)

**Reprinted from an article appearing in* Forest and Stream, *May, 1882.*

Mirror To The Past

"To eyes that have learned to see, fossils are very much alive"

—G. G. Simpson

by Dr. Donald W. Fisher,
State Paleontologist,
N. Y. S. Museum and Science Service

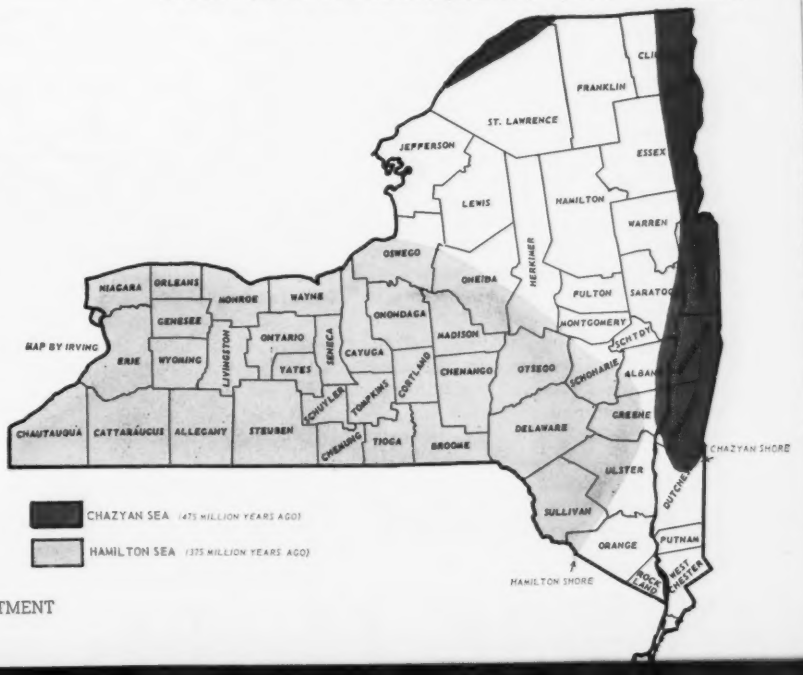
THOSE of us employed by public agencies are constantly approached with inquiries and visits. Many of these are by people who have found, what to them seem, strange or unusual objects in the rocks. As a paleontologist or one who is concerned with the study of ancient life, I am both encouraged and amused by the ideas that some persons have regarding fossils. Encouraged by such young accomplished fossil collectors as the 10-year-old girl who was planning her college career in paleontology; amused by the elderly lady who, on visiting the State Museum, informed me that as a young girl she recalled mastodons roaming her father's farm!

Markings in the rock seem to have attracted man's attention from almost his beginning. Primitive cave men noted them — so did the ancient Egyptians, Greeks and Romans. Some of the learned of history, Aristotle and Leonardo da Vinci, for example, correctly perceived that many of these markings were the remains of life long since dead. During the Middle Ages, scientific study was stifled and paleontology stood still. Alternately, fossils were regarded as objects created by God to confuse the mind of man, and as objects created by Satan to accomplish the same objective. Owing to the tremendous power of the church, at least two ideas were circulated which, oddly enough, persist today in a few minds. The first was the view that the Earth is relatively young and was created on October 26, 4004 B.C. at 9 o'clock in the morning! The second was that fossils were the "unchosen ones" which perished catastrophically and simultaneously in the Noachian Deluge. There is no scientific data supporting either of these but there is considerable data showing that the Earth is very old (perhaps five billion years) and that different kinds of animals and plants made their appearance, evolved, and disappeared from the Earth at different times during the geologic past.

Fossils are not curiosities of Nature, to be used only as attractive paperweights and bookends; they are the documentation of the parade of life on this planet Earth. As with Alice in Wonderland's looking glass, the rocks with their entombed fossils mirror an orderly succession of life and events, and to those who are able to read the record, a fascinating history takes shape. In order to fully appreciate the application of fossils in historical geology, it is necessary to know two fundamental principles or laws. The first is the *Law of Superposition* which states that in any undeformed pile of sedimentary rocks, each bed is younger than the one below it and older than the one above it. The second is the *Principle of Faunal Succession* which states that groups of fossil plants and animals succeed each other in a definite and determinable order, and each period of time can be recognized by its respective fossils.

Past life, only a fraction of which has been preserved, was buried in sediments (sand, silt, mud, marl, peat). Compaction over millions of years produced sedimentary rocks (sandstone, siltstone, shale, limestone, coal). Thus, the most obvious place to locate fossils is in sediments or sedimentary rocks. Only on rare occasions are fossils found in metamorphic rocks (slate, marble) or igneous rocks (lava, volcanic ash). Aquatic plants and animals (especially shelled ones) are more liable to be preserved than land organisms because, on death, the water-dwellers sink to the bottom where they are more susceptible to quick burial, thus preventing rapid decay. Much of New York State is mantled by sand and clay but because most of this is transported material of continental glaciers, fossils normally would not occur in them. Beneath this sediment cover, however, are marine sedimentary rocks which hold the life of 600 million years ago to about 350 million years ago. Older, highly metamorphic rocks of the Adirondack Mountains and Hudson Highlands are unfossiliferous. The

Tinted areas are best hunting grounds for fossils in New York



generalized geologic map (pg. 26) indicates the most likely areas for fossil collecting. Tools and techniques of fossil collecting, preparation and storage are described on page 48 of this magazine.

Like Sherlock Holmes or an efficient police force, the fossil detective, too, must carefully study and learn the physical makeup and *modus operandi* of his quest in order to "capture" with the least effort. In both cases, clues may be difficult to find—or they may be under our very noses! Physical makeup, called morphology, is best gained by learning as much as one can about the living descendants of past life. Habits or *modus operandi* are also acquired in this way. Ancient habitats or living areas are reflected in the types of rocks. Thus, the fossil detective (paleontologist) must not only understand living organisms but he must know his rocks or else he may be stalking in the wrong domain. Paleontologists play the dual role of geologists and biologists.

Collecting fossils may be a hobby but studying them is a science. When we realize that they were once-living with functions and behavioral patterns like living animals and plants, and at the same time reflect on the immensity of time over which they have lived, it is obvious that fossils are the solution or the key to the history of life. The student of modern life, the biologist, is handicapped for he does not have at his disposal past generations of organisms for comparison. Were we to know only our own generation, and not preceding ones, the course of human events would be impossible to trace.

Animals and plants change through time. Some change greatly, others change but slightly. Conservative organisms which have persisted virtually unchanged for millions of years are colloquially called "living fossils." However, their more progressive changing "cousins" furnish the important data on time equivalency of geographically widespread rocks, patterns of evolution, and ancient habitats. Guide or index fossils are relatively short-lived species which were geographically abundant and widespread and are easily identified, and which enable correlation of rocks in distant regions. As there are so few good guide species, guide assemblages are customarily employed. Fossils are the most important witness in the "courtroom drama" of the defense of evolution. Whereas comparative anatomy shows that evolution is possible and comparative embryology that it is probable, paleontology demonstrates its truth.

Within the past twenty years much progress has been made in the study of the inter-relationships of past species to one another and their enclosing rock, or environment (paleoecology). Here is a remarkable example of what science can do with the tools and techniques currently at its disposal. Since the abundance of the oxygen-18 isotope in calcium carbonate varies with the temperature at which it is deposited from water, the variation in abundance can be used as a paleo-thermometer. Recent research (1951, Urey, and others) on some squid-like fossils (belemnites) that lived about 150 million years ago (Jurassic Period) reveals, "This Jurassic belemnite records three summers and four winters after its youth . . . warmer water in its youth than in its old age, death in the spring, and an age of about four years. The maximum seasonal variation in temperature is about 6°C [42.8°F]. The mean temperature was 17.6°C [63.7°F]." Sounds fantastic, doesn't it? But I am sure that grandfather would have considered it sheer nonsense to believe that a man could be "shot" around the Earth in a rocket in a short space of a few hours—but it has come to pass!

Before we proceed further, it is necessary to know something about classification. Creatures may be classified in many ways. They may be grouped according to the environment they occupy, or by their method of locomotion, or by their physiological activities. The last named, the so-called "blood relationship," is almost universal. But this can only work within an interbreeding population, for like species must have the ability to interbreed and produce fertile young. Naturally, this is difficult to prove with fossils. As a result, most fossil species are so grouped because they are "look-alikes." Nevertheless, species are the building blocks of evolution. No one classification is "right" or "wrong" but merely reflects abstract concepts like "good" or "bad." The organic world is divided into large categories called Kingdoms (Plants, Animals). These are divided into Phyla (singular-phylum; pronounced fi-lum), in turn divided into Classes, then into Orders, then into Families, then into Genera (singular-genus), then into Species, and finally into Individuals. The following examples typify the classification; the submarine is included to show how this classification system can be used for inanimate objects.

Taxon

Kingdom			
Phylum			
Class			
Order			
		Family	
		Genus	
		Species	
		Individual	

Man

Animalia	Hominidae
Chordata	*Homo*
Mammalia	*sapiens*
Primitida	S.S. No. 012 345 678

Trilobite

Animalia	Phacopidae
Arthropoda	*Phacops*
Trilobita	*rana*
Phacopida	Specimen No. 999

Submarine

Machines	Nuclear Power
Transportation	Source, U-238
Sea-going	Polaris-equipped
Submersible	Nautilus No. 571

At the Class level, the degree of differentiation among ships, autos and airplanes are comparable to those among fish, mammals, and birds or trilobites, scorpions, and insects. At the Order level, the degree of differences between surface ships and submarines is analogous to that between primates and rodents.

We turn our attention, now, to a brief survey of the types of fossils likely to be found in New York State rocks. Occasionally, a letter arrives requesting the names of all fossils and fossil collecting localities in New York, and a representative collection. Naturally, this is an impossible request to fill. Over 10,000 species of fossils have been found in the State and hundreds of collecting localities are known. Those fossils, with their accompanying restorations, so painted (centerspread) by H. Wayne Trimm, are but a few of the most common types that may be found after relatively little search. All are backboneless animals (invertebrates) and have external skeletons or some hard parts.

Phylum Porifera (po-rif'-ur-ah)—These are the pore-bearers or sponges which, to some, look more like plants than animals. Sponges are vase-like, saucer-shaped or barrel-like animals which secrete tiny skeletal networks of silica, calcium carbonate or spongin. They lead attached (sessile) lives.

Phylum Coelenterata (seh'-len'-tur-ah'-tah) (coelenteron-hollow gut).

Class Stromatoporoidea (stro'-ma-top'-o-roy-dee-ah).—These extinct colonial animals constructed finely layered cabbage-like mounds of calcium carbonate and were important reef builders in clear, warm, shallow seas (see Ordovician diorama on back cover).

Class Scyphozoa (sy-fo-zo'-ah)—The jellyfishes, because of their delicate makeup, are seldom preserved except as impressions. An extinct group, the Conulariids (con'-u-lary-ids) are sometimes found as black, four-sided, phosphatic cones.

Class Anthozoa (an'-tho-zo'-ah)—Corals are the most abundant of fossil coelenterates and the second most abundant fossil in New York rocks. Both colonial "apartment houses" and solitary horn-shaped skeletons are common in limestones and calcareous shales. Many reefs in the Lockport, Coeymans, Onondaga, and Hamilton formations are constructed primarily of corals.

Phylum Bryozoa (bri-o-zo'-ah)—The so-called "moss-animals," which build coral-like colonies of attached fans, fretworks, knobs, or delicate pillars, are among the most beautiful fossils because of their intricate patterns. They were important contributors to reefs and are especially common in limestones and calcareous shales.

Phylum Brachiopoda (bray'-kee-o-pod)—Brachiopods, the most abundant fossils in New York, consist of two shells or valves which open and close by powerful muscles. Most are fixed throughout life except in the embryonic stage. There is considerable variation in size, shape and ornamentation but some of this may be due to differentiation within species brought about by environmental factors like temperature, salinity, rough water, etc. Brachiopods are found in virtually all marine sedimentary rocks.

Worms—The several phyla of worm-like animals are lumped together because they are uncommon as fossils. Usually, only their trails, burrows, or excreta (coprolites) are found because worms are soft-bodied and do not lend themselves to preservation. A few secrete hard calcareous or chitinous tubes.

Phylum Mollusca (mo-lus'-ka).

Class Pelecypoda (peh-liss'-eh-pod).—Here belong the clams, oysters, and scallops. The soft body is enclosed in two shells which commonly are the mirror image of one another. Most crawl sluggishly on the bottom and burrow into sand or mud by means of a powerful fleshy foot. Some, like the scallops, can swim by clapping the two shells together.

Class Gastropoda (gas-tro'-pod).—Snails are common fossils in New York rocks. Their structure, coiling, and size suggests that they have not changed much through the ages.

Class Cephalopoda (sef'-ah-low-pod).—Two types of chambered shells are found in New York, nautiloids (naw'-teh-loyd) and ammonoids (am'-o-noyd). They differ in that the latter have complicated and crinkled rear walls to their living chamber. Both were free swimming carnivores. Except for the living *Nautilus*, cephalopods are represented today only by squids and octopii.

Tentaculitids (ten-tak'-u-ly-tids) are an interesting extinct type of mollusk consisting of a small, ringed, chambered cone. Their preferred orientation in swarms enables one to determine ancient current directions.

Phylum Arthropoda (ar'-throw-pod) (jointed legs).

Class Trilobita (try-low-by'-tah).—These extinct, many segmented and legged forms are commonly found disarticulated or enrolled. They are clearly divided into head, body, and tail, or three parts. They are also divided lengthwise into three parts or lobes. Most were bottom crawlers or burrowers; some were swimmers. Trilobites are the forerunners of lobsters and crabs.

Class Merostomata (mare-o-sto'-ma-tah).—Included here are spiders, king crabs (which really aren't crabs), and the extinct "sea scorpions" or eurypterids) (u-rip-tur'-ids), the largest of all arthropods. When found, eurypterids are profuse but they are restricted to certain formations.

Phylum Echinodermata (ee-ki'-no-dur-ma-tah) (spiny skinned).

Class Edrioasteroidea (ed'-ree-o-ass'-tur-oy'-dee-ah).—These are the star discs which look like starfish attached to a padded cushion-like disc covered with various shaped plates. They are an extinct primitive type echinoderm, uncommon in New York.

Class Cystoidea (sis-toy'-dee-ah).—Cystoids are sac-like extinct echinoderms with or without stems and with poorly developed feeding arms or none at all. Plate arrangement on the sac (calyx) is quite irregular. They are most common in limestones.

Class Blastoidea (blas-toy'-dee-ah).—Blastoids are similar to cystoids except that the feeding arms are better developed and the calyx plates are regular in their arrangement. (see Ordovician and Devonian dioramas).

Class Crinoidea (kri-noy'-dee-ah).—Crinoids or "sea-lilies" are very beautiful when the calyx and well developed arms are found. The calyx plate arrangement is regular and complex. Crinoids have long segmented stems consisting of circular or star-shaped columnals which comprise much debris in some limestones. Holdfasts anchored the animals to the sea bottom. A few species are living today. Most fossils are found in limestones or calcareous shales.

Class Stelleroidea (stel'-ur-oy'-dee-ah).—The starfishes of bygone ages were extremely similar to those living today, both in structure and habits. They have always been the menace of oyster and clam beds and a worry to shell fishermen.

Graptolites (grap'-toe-lights). — These are extinct animals whose biologic position is in doubt as they have left no close relatives. They resemble pencil markings of tiny saw blades on black shale. Some (dendroids) were fan-like, resembling some bryozoans; most were serrated rods. Most, if not all, graptolites were floaters. Some workers consider them coelenterates; others refer them to the hemichordates or intermediate between the backboneless and backboned animals.

History of Life in New York

Like the endlessness of space, the vastness of geologic time is difficult to comprehend. Because a paleontologist is the historian of ancient life, he is intimately concerned with geologic time. This time scale has been arbitrarily broken up into segments; the largest—eras, are divided into periods; periods into series; series into stages. Intercontinental correlation is presently at the stage or sub-stage level. These segments serve as "handles" in discussing past life and past events. Just as we refer to something as happening last Monday, last February, or during the last century, so the paleontologist refers to an event or a species as living during a former interval of time, for example the Devonian Period. As with constellations, the division names could have been derived from Greek or Roman mythology, or they could have been named after Presidents! Instead, geologic periods, series, and stages are named from the original areas where these rocks were first studied. For example, the Devonian Period was named from the County of Devon, England; the Medial (Middle) Devonian Series of North America, the Erian, was named from the region along Lake Erie.

Figure (pg. 26) depicts geologic time (eras and periods only) as related to a 24-hour clock. Note that considerable time elapsed before fossils are known to have existed, and that man is a late-comer in the passing parade of life. Remember, also, that the record of life in the rocks is an incomplete one and reflects but a small fraction of the teeming hordes that once populated the Earth. Undoubtedly, some extinct plant and animal groups, like missing persons, vanished without a trace.

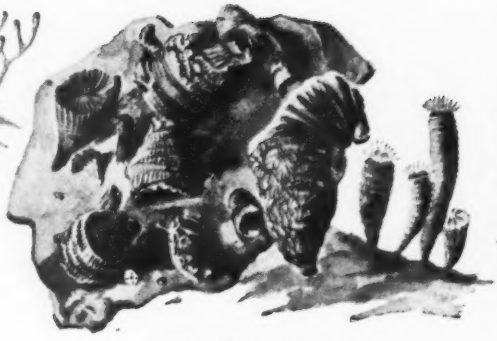
The story of life through geologic time can be compared to an old, badly tattered and badly misused book from which many pages are missing, and those remaining are yellowed and difficult to read. This is especially true of the earlier part of the geologic "book." It is encouraging that the once numer-

(Continued on page 26)

SOME FOSSILS OF

SPONGE *(Hydnoceras)*
Devonian

MOSS ANIMAL *(Bryozoan)*
Devonian



CONE-HYDRAS *(Conularia)*
Devonian

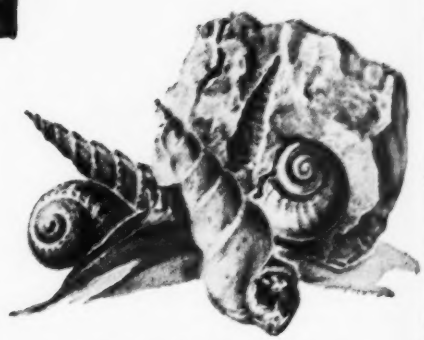
CORAL *(Zaphrentis)*
Devonian

BRACHIOPOD *("Spirifer")*
Devonian

CLAM *(Glyptodesma)*
Devonian

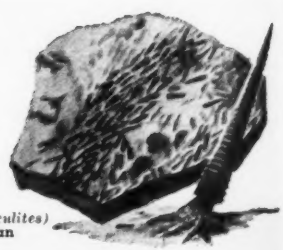
STALK

SEA WORM *(Protonympha)*
Devonian



SEA SNAIL (High—*Hormotoma*)
(Low—*Poleumita*)
Silurian

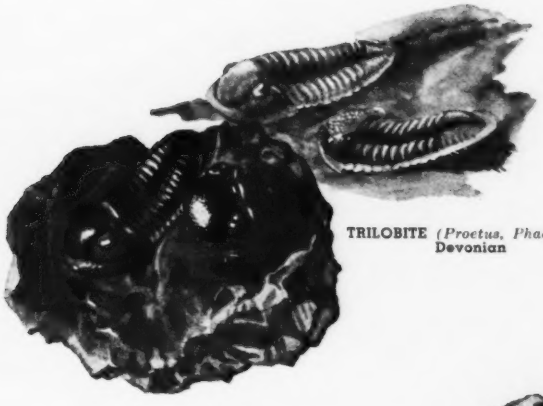
CEPHALOPOD *(Nephriticeras)*
Devonian



RING-CONED MOLLUSK *(Tentaculites)*
Devonian

OF NEW YORK

SEA SCORPION *(Eurypterid-Eurypterus)*
Silurian

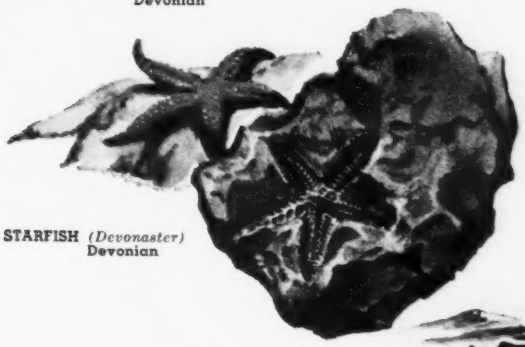


TRILOBITE *(Proetus, Phacops)*
Devonian

STAR-DISC ANIMAL-Edrioasteroid *(Agelacrinites)*
Devonian

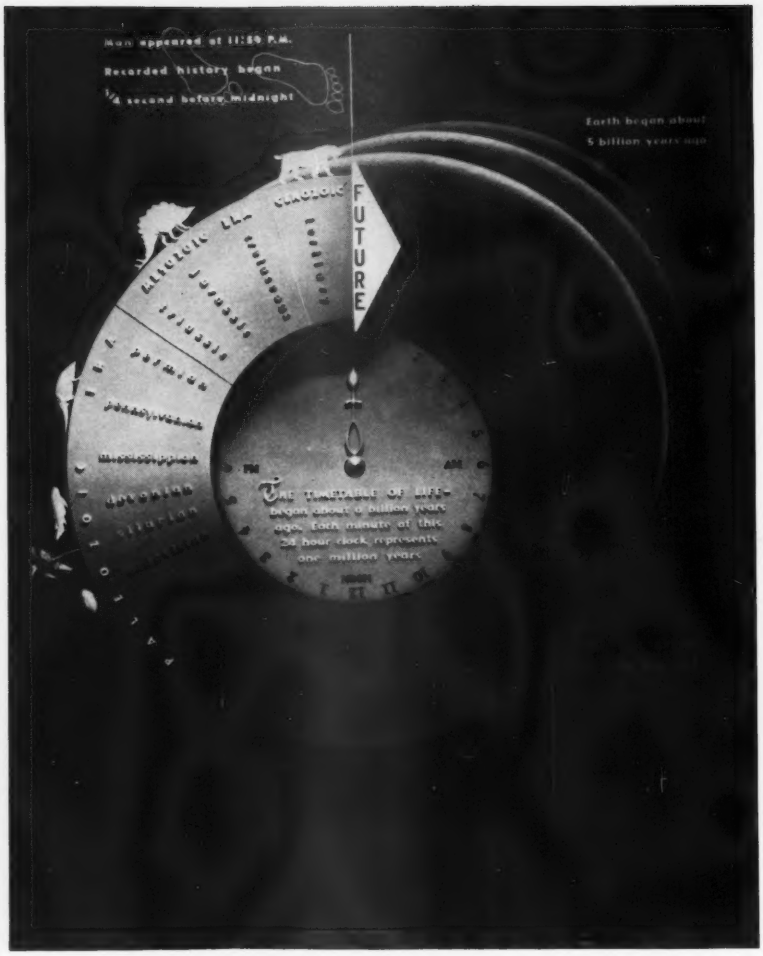
STALKED SAC-ANIMAL-Cystoid *(Lepidocrinites)*
Devonian

SEA "LILY" *(Crinoid)*
Devonian



STARFISH *(Devonaster)*
Devonian

SAW-EDGE ANIMAL *(Graptolite)*
Ordovician



Geologic timeclock—man is a latecomer on the scene

(*Continued from page* 23)

ous gaps are gradually being filled. Some will probably never be filled—the pages are lost forever.

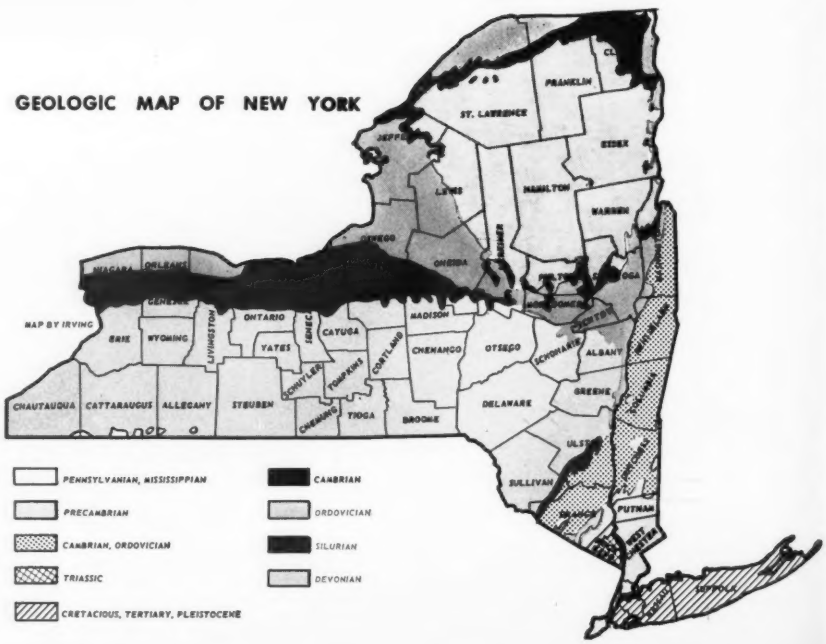
In New York State, we are able to "read" only the first four chapters (geologic periods) of the "Book of Ancient Life" with any degree of certainty. The "preface" is brief, for it concerns the immense span of time (perhaps 5 billion years) for which we have no record of life. During that interval, the rocks of the Adirondack Mountains and Hudson Highlands were deposited. They are highly deformed metamorphic rocks which were primarily sediments accumulated in water. Owing to the weight of subsequently deposited sediments, these older rocks were buried deeply, and changed in form or actually remelted by execessive heat and pressure. If any fossils were present, they were obliterated during recrystallization of these rocks.

The Cambrian Period

The earliest portion of geologic time in which fossils are reasonably common is the Cambrian (cam'-bree-an) Period which began about 600 million years ago. Many Cambrian "pages" are missing in New York. Lower Cambrian rocks occur in the Taconics, east of the Hudson River. They will be disappointing to the fossil hunter, as specimens are rare and fragmentary. Primitive trilobites, worm tubes, and brachiopods may be found. There are also many types of simple conical shells which seemingly left no present-day survivors. These short-lived "experiments of Nature" are perhaps the most interesting Cambrian life. Whereas Early Cambrian seas were restricted, Late Cambrian seas flooded a much broader area. Upper Cambrian rocks rim the Adirondack Mountains (except in the Black River Valley), and outcrop in the Hudson Valley. New creatures made their entrance; snails and nautiloid cephalopods. Higher types of trilobites crawled in the quartz sands and lime muds of Cambrian beaches and quiet lagoons. Algal reefs grew in clearer inter-tidal waters. On and near these reef "supermarkets" thrived most of Late Cambrian life for food was plentiful. Creepers and crawlers dominated the Cambrian scene, which lasted for about 100 million years.

The Ordovician Period

The next chapter, the Ordovician (or'-doe-vish'-an), which began about 500



million years ago and endured for 75 million years, is well represented in New York and its rocks are superb collecting beds. Mollusks fluorished in the inviting carbonate environments of the Early and Medial Ordovician and in the quartz-sand ones of the Late Ordovician. So uniform and hospitable were the conditions in the Early Ordovician that gastropods and nautiloids experienced their greatest evolutionary "explosion." Trilobites attained their zenith in development and abundance and were the "garbage collectors" of the ocean floor The Early Medial Ordovician (Chazyan) scene depicted on the back cover illustrates three environments represented by Chazyan limestones: lagoonal, off-reef or flanking-reef, reef. Note that some animals, particularly those that were fixed to the bottom, are restricted to a single habitat whereas the mobile forms were tolerant of different surroundings. Snails and nautiloids were frequent visitors. Bryozoans made their appearance; echinoderms, notably cystoids, first became prominent. Perhaps the most conspicuous new arrival were the stromatoporoids, like *Stromatocerium*, which constructed moundlike reefs which acted as havens for trilobites seeking to escape the tentacles of large nautiloids. The earliest corals (*Lichenaria*) assisted in this reef construction.

An even richer collecting ground is the Late Medial Ordovician Trenton Limestone of the Black River, Mohawk and Champlain valleys. Brachiopods continued multiplying in their efforts to overwhelm the sea bottom. Some bedding planes are covered with nothing else —and often only one species. Clams and crinoids increased markedly and bryozoans and corals continued to evolve into new "players." Snails are sometimes so densely packed as to form a "snail hash." Competition for survival was keen and trilobites were unwilling to forfeit domination to the predatory nautiloids. Meanwhile, in a contemporaneous black mud setting, remains of floating graptolites were settling in the soft ooze. Food deficient, hydrogen sulfide-rich sea bottoms presented a most unwelcome stage for creatures which cavort on the sea bottom. These graptolites may be found today in the Deepkill, Normanskill, and Utica black shales.

Late Ordovician rocks are non-marine red shales, beach sandstones and gray shales comprising the huge Queenston delta extending from central New York westward into Ohio. This delta was produced by erosion of Alpine-like mountains, formed by crustal upheaval in New England and eastern New York. Fossils are less abundant; those that occur are primarily brachiopods and clams.

The Silurian Period

Although the succeeding Silurian (sih-lu'-ree-an) Period encompassed only 20 million years, it reveals one of the most varied paleoecologic stories. Concurrently, the evolutionary tree of life took on a new cloak; some branches began to wither only to be supplanted by new shoots. As the land was still treeless and grassless, soil was easily stripped away. Lower type plants were ineffective in reducing large scale removal of weathered rock from the land. However, the nature of the alternation and abrupt changes in sediments coupled with the interesting faunal associations implies a patchy, though scant, plant veneer. The Clinton group of formations holds an array of interesting faunas, not the least of which are those occurring in thin but widespread bands of red iron oxide (hematite). Some bedding planes within the Sodus Shale and Wolcott Limestone are "paved" with brachiopods. Algal reefs in the Irondequoit Limestone played host to prospering new types of brachiopods and trilobites. But the paradise for Silurian invertebrates (and for fossil hunters) lies in the Rochester Shale. These interbedded calcareous shales and argillaceous limestones have yielded a great wealth of fossils distributed throughout over 200 species. There were swarms of tiny bean-shaped ornamental ostracodes, myriads of stalked echinoderms, and mats of lacy bryozoans. Trilobites were relinquishing their superiority. Mastery of the pelagic realm (swimmers and floaters) was retained by the nautiloids although their relatives, the tentaculitids outranked them in numbers. The profuse aquatic life of the Medial Silurian terminated with the Lockport Dolomite in which increasing salinity of the waters foreshadowed the demise of many strains of life. Adverse physical changes added to unquestionable rivalry for diminishing food supplies certainly prompted search for newer living quarters. Land scorpions, "cousins" of the eurypterids so plentiful in the Late Silurian Bertie Waterlime, may have been the pioneer venturesome explorers which followed the journey of the plants, seeking less competitive living in a new medium, the air—thus beginning the invasion of the land.

The Devonian Period

But the climax of invertebrate life in New York was reached in the following Devonian (dee-vo'-nee-an) seas. The 55 million year Devonian Period began some 400 million years ago with the deposition of the fossiliferous Helderberg limestones which abound in brachiopods. Echinoderms and bryozoans are next in numbers. Mollusks are strangely scarce. One of the subdivisions, the New Scotland Limestone, has yielded almost 250 species of fossils. The younger Onondaga Limestone and the succeeding Hamilton group of formations are known worldwide for their prolific and varied faunas. The deposits of the thick Catskill Delta, which resulted from erosion of rising land to the east demonstrate the relations of fossil faunas to their physical niches. So, too, many habitats existed during Hamilton sedimentation. Only three are portrayed in the colored diorama on the inside front cover: shoreward sands and silts grading into intermediate calcareous muds in turn grading into dark gray to black muds. Note the increase in pelagic life (swimmers and floaters) as contrasted with the earlier Ordovician scene (back cover). Clusters of brachiopods and beds of clams and oysters are common. Echinoderm "gardens" and coral and bryozoan "cities" dot the sea bottom. Vertebrates become important actors and the fishes (see THE CONSERVATIONIST, Feb.-March, 1958, p. 22-28, 35) vie with the predatory nautiloids and their "cousins," the ammonoids, for command of the pelagic realm. Trilobites passed their heyday; only a few stragglers survived the close of the Devonian. "Nests" of sponges form highly colored patchwork "quilts" on the sea floor. Graptolites are unheard from, having vanished almost as rapidly as they entered the life story. Appropriately, the curtain descends on the New York fossil story as the drama of life shifts to the land. Plants were fast carpeting the land in green. Vertebrates were undergoing important evolutionary changes which triggered the reaction that some distant day would give rise to man. Adventuresome fishes evolved through amphibians, through reptiles, to the mammals, which today inherit the Earth.

A brief curtain call occurred in the last Ice Age (Pleistocene) of some 100,000 to 5,000 years ago. Those making this "walk-on" were clams, snails, and barnacles in marine sands of the Champlain and St. Lawrence valleys and fresh water clams and snails of lakes and ponds which preceded the peat and marl areas of today. A "new look" in land roving vertebrates such as mastodons, mammoths, giant beavers, caribou, musk oxen, and long-horned bison (see THE CONSERVATIONIST, Feb.-March, 1955, p. 18-22) causes one to wonder what might have been on the missing "pages" of New York's "Book of Ancient Life." Our mirror to the past became clouded at the close of the Devonian; the missing links of the chain of life must be forged from outside of New York State.

Checking the sleds at the base ....

High on the wall of Shady

The Olympic Bobsled Run at Mt. Van Hoevenberg

by Nick Drahos, N.Y.S. Conservation Dept.

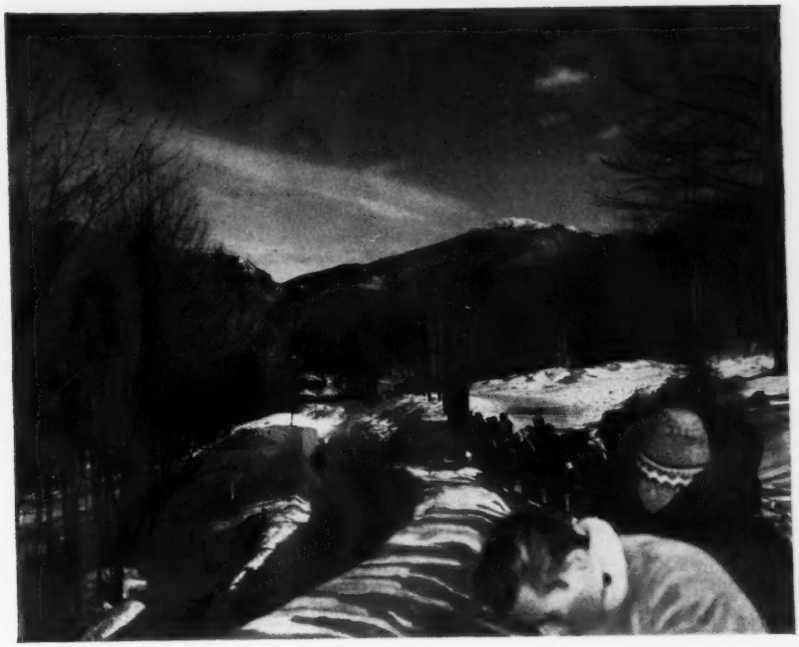
YOU are standing on top of Mt. Van Hoevenberg, site of America's one and only bobsled run. The air is frosty, the day is clear and there is a grand view of the Adirondack Mountains for you to appreciate. You've spent the week end watching one of the many bobsledding events which take place from January through March each year at this winter sports mecca, operated by the New York Conservation Department. You've ohed and ahed with the rest of the crowd as the sleds roared down the icy mountain chute. Now the races are over, and it's your turn to ride, not as a racer but as one of the public, in a Conservation Department sled.

"Clear the track!" an insistent voice peals forth over the loudspeaker. Far down the valley other relay speakers echo the words. If you listen carefully, the words bounce off the Sentinel Range, far across the valley. But you're not listening carefully, you're watching your bobsled glide up to where you are standing. You take your seat, brace your feet and adjust your grip on the hand straps as the brakeman shoves the sled off the landing down the run. You're off!

The sled trundles slowly down the long smooth six-foot wide ice gutter, bounded by the biggest ice cubes you've ever seen. These form the side walls of the run. As you slide through a couple of minor curves picking up speed, you adjust yourself to the feel of the sled. Your ears begin to listen to the loud rumble of the sled as you go through the curve at Cliffside. Suddenly you're conscious of speed. The walls of ice are rushing by and your sled is roaring down a mile-long icy mountain chute at full speed. You look ahead. The wind whips into your eyes and tears suddenly blind you. Your mind registers the fact that blue-green ice cubes have now turned into a bluish-white streak. As the sled peaks in a curve high up on the icy wall, you get a quick glimpse of the next curve bearing down on you. You duck your head behind the driver's shoulders and your hands grip convulsively on the hand straps. You can't grip them tightly enough as the sled lurches sideways, snapping your body and head first one way, then the other in a quick one-two motion.

About this time, that cocksure confident eager look on your face—the one you bought your ticket with—has become a set mask of squinted eyes and grim lips. Your heart is pounding wildly and your mind begins to question your sanity. Above the rumble of the 485-pound steel monster you're sitting on, you vaguely hear "Shady" over the loudspeaker. The sled slips through the first minor curve above Shady. Your body does a quick cant to the right with the sled, momentarily rights itself, then whips over to the left as the sled abruptly slams against the end of the second curve. Your stomach bounces against your diaphragm, forcing your breath out in a whooshing groan. You try to look up but don't dare for the sled is suddenly falling away from your underparts as it

—A Moment of Breathless Speed in a Topsy-Turvy World of Blue-Green Ice



A sled in Little "S"

Through the finish line

dips into the short run just before entering Shady, an awesome 22-foot high curve. Your stomach floats upward, your whole body is free of the sled—it seems—and your mind wildly compares the sensation with a down-draft during the last airplane ride you took.

You began this ride with an anticipating, open mind. Now you realize it was all a mistake. You are still falling and you succeed in looking up, just in time to see the black hole of Shady yawning ahead. It engulfs you. You're in the dark. Your sled cants to the right, your head hits the driver's shoulder and your feet push frantically against brakes that aren't there. Wh-o-o-sh! Your world is topsy-turvy, bleary and you hang on for dear life. Your body flips upright suddenly and you thank your lucky star for the hand straps as you roar out of Shady at 60 miles an hour.

You gasp for breath. Your eyes are crying. You wish you could see. Your mind tells your arm to brush away the

(*Continued on page* 34)

Mount Marcy

New York's Highest Mountain--
A Scenic and Scientific Wonder

by Edwin H. Ketchledge,
Assistant Professor, Forest Botany,
State College of Forestry
at Syracuse University

Mount Marcy as viewed from Mount Skylight

EARLY in the last century a New England poet, William Cullen Bryant, began a now famous poem with these lines:

"To him who in the love of nature holds
Communion with her visible forms, she speaks
A various language."

In many ways this is especially true for those of us who regularly enjoy the mountains and woodlands of New York State. To each of us the Catskills and Adirondacks offer something distinctive or hold a special meaning. Many enjoy the mountains passively, finding satisfaction and reward in quietly viewing the striking beauty and scenery of our wildlands; others engage in activity of a more vigorous nature. Whether by hiking and camping, by hunting and fishing or in less strenuous pursuits, all outdoor enthusiasts share a communion with nature which restores one's spirit and perspective in a trying world. For many, this inner contentment is associated with some favorite location, as a peaceful lake or forested mountain, where new experiences are enjoyed or happy memories relived. Perhaps no one spot in the Adirondacks better symbolizes this aspect of our wildland heritage than Mount Marcy, highest and most dramatic of New York peaks. Other mountains, more accessible, may attract more visitors than Mount Marcy but none can match the romance of this king among giants. Year in and year out it offers recreation and re-creation to those who enjoy the wonders of nature. Our purpose here is simply to tell you a little about Mount Marcy, hoping that before long you too will visit it and share its wonders.

The geologists tell us our mountain is a study in contrasts. On the one hand, Mount Marcy and the other high peaks of Essex County are very ancient: their rocks crystallized from molten magma deep within the earth long before life appeared on the planet. Ages and ages ago our mountains-to-be were elevated high above the surrounding lands and waters and remained an island during eons of time while sediments were building up beds of stratified rocks elsewhere in the State. Yet, in another sense, Mount Marcy is very young, because its present form and shape are new. The modern Marcy is actually the root of an older Marcy, long since eroded away to its present form. So, old in structure, Marcy is youthful in appearance, in a way an example of perpetual youth, accumulating years but no older today than yesterday.

The entire high peak region is technically one big rock, covering 1,200 square miles and composed entirely of anorthosite, a type of granite varying from nearly white, as seen on Whiteface Mountain, to bluish gray, as on Mount Marcy. Although the geological details may not intrigue us all equally, even the casual climber of the slopes of Mount Marcy may make two interesting observations of the minerals along the

Plateau Camp lean-to, northeast slope at 4,500 feet

MacDonald emergency shelter atop Mount Marcy

trails. For one thing, the most characteristic mineral of the region, labradorite, exhibits an iridescent play of color when turned in the sunlight. This is especially noticeable in the rocks and gravel of stream beds. To see this wonder, one need only to get down on hands and knees, look down at the streambed in the direction or angle of the sun, and behold, the opalescent lavender-green of labradorite, a miniature northern lights in the crystal-clear waters that drain from the slopes of Marcy.

The other mineral curiosity, best seen on the higher slopes, is also worth a few minutes search. Scattered in the bedrock may be found clumps of ore minerals or other dark-colored crystals. Commonly these crystals are surrounded by a reddish-brown rim or border of minute but lustrous garnets, so small that individually they resemble specks of red dust. With a small magnifying glass, however, each garnet envelope appears beautifully ornate, faithfully outlining the large crystal enclosed.

The biologist, another witness to the many wonders of Marcy, tells us that vegetation gives a region its distinctive character. Here on the slopes of Mount Marcy we see three distinct types or zones of vegetation, each corresponding to an altitudinal level. The lower slopes are clothed in the light green foliage of deciduous-leaved hardwoods, of which sugar maple, American beech and yellow birch are the most abundant; some other hardwoods, such as red maple and the aspens, attest to logging and fires of an earlier day. As one moves up onto the middle slopes, however, a pronounced change occurs. Before the 3,000-foot level is reached, most hardwood trees drop out, leaving a forest of dark green balsam fir and red spruce. Only an occasional paper birch or mountain-ash breaks the otherwise pure canopy of conifers. Climbing upward through the spruce-fir belt, the climber notices two gradual changes in the composition of the forest. First, the red spruce becomes less frequent as higher elevations are reached; above 4,200 feet only balsam fir remains. Moreover, the trees become progressively smaller on the higher mountain slopes. Near timberline the fir forest is reduced to dwarfed scrub growth so dense a climber leaving the trail must crawl under or swarm over the stunted trees. At 5,000 feet the scrub forest gives way to alpine meadow, our third zone.

To many visitors on the mountain it is this tundra-like zone which makes the trip most rewarding, for here, just a few miles from home perhaps, one is figuratively transported several hundred miles northward into the Canadian Arctic. All around are seen Arctic-alpine plants rare or unknown elsewhere in these latitudes—the Lapland rosebay, in brilliant rose-red flower each June; the mountain sandwort, with delicate white blossoms in midsummer; the alpine goldenrod, in bright yellow bloom in late season; and many other hardy inhabitants on our summit in the clouds, each glorifying the landscape in its own way. Many of the alpine rarities, we have learned, are Arctic relics of the Ice Age, left isolated in the wake of retreating glaciers 10,000 years ago; they still hold out in the cool climate of the summit, though their days are certainly numbered. The photographer, of course, can capture their beauty and charm for later enjoyment. The rest of us try to telescope a week of observing and appreciation into an hour or two before we return to the world below.

One may wonder, just why is the summit so strikingly different? Simply because the environment is so extreme. Here, at the very roof of New York State, only those dwarfed plants hidden beneath an insulating blanket of snow survive the extreme low temperatures and drying gales which sweep the summit in winter. Yet this is only half the battle for survival. During the growing season, of barely three-months' duration, the active plant must satisfy its water and mineral needs from a critically thin soil layer perched on top of massive bedrock. The soil here is very infertile since it is composed primarily of undecayed dead organic material and is deficient in nutrients. Also, with solid bedrock immediately below, no subsurface water supply is available in times of drought.

At 5,000 feet, the fir forest gives way to alpine meadow

It is a wonder indeed that complex higher plants keep company with the hardy rock mosses and lichens in this land of extremes!

Everyone climbing the mountain is likely to notice the apparent absence of animals. Man is an intruder in the life of an animal, a stranger he avoids; thus, to observe wildlife, the hiker must be quiet and as inconspicuous as possible. Silently walking through the spruce-fir belt, the observant climber may see or hear the usual species of wildlife characteristic of the Adirondack region, but toward timberline and the summit fewer and fewer species are evident. Last summer a doe and her fawn frequented the grassy opening at dusk around Plateau Camp, at 4,500 feet. One late afternoon, while eating an early supper at Plateau Camp, the writer shared the lean-to with a myrtle warbler, a slate-colored junco and a white-throated sparrow, each intent in a search for bugs or crumbs among the boughs. Two varying hares occupying the clearing were less inclined to be sociable. On the same occasion, a red-backed mouse and a white-footed mouse were seen scampering across the trail nearby. Given sufficient time, a greater array of birds, wildlife and lesser animals may be studied in their natural haunts.

This is only a small portion of the story of Mount Marcy, however. Perhaps the greatest wonder, enjoyed by the greatest number of people, is simply the scenic beauty presented here to all blessed with the strength and willingness to climb the mountain. At 5,344 feet, the summit offers one of the very best views attainable in the high peak region. From the summit dozens of lofty peaks may be identified reaching upward in the distant sky. After a storm, with the valleys below filled with fog, the peaks resemble islands in a sea of clouds. When the air is clear, Lake Champlain and the Green Mountains of Vermont stand out sharply to the east. Southward, Blue Mountain and the central Adirondacks spread out in vivid panorama. Westward rises the high silhouette of Santanoni and Panther Mountain, and to the north Canada may be seen on a clear day. As is true of so much in this mortal life, the thrill and excitement of the view from the summit must be experienced to be appreciated. Even the casual hiker, out for exercise alone, is struck by the uniqueness of the world of the summit. No visitor leaves without an indelible impression that here is something different, something to be remembered and relived, in years to come. Standing at the pinnacle of the Adirondacks, each climber finds his own meaning in the voice of nature.

In this vein, all of us can be thankful for the foresight and initiative of the Conservation Department in providing the hiker and camper with a marvelous system of trails and shelters throughout the high peak region. Four different trails, one from each cardinal direction, lead to the summit, with over thirty lean-tos along the way. The Van Hoevenberg Trail from Heart Lake, seven miles north of Marcy, is the oldest, shortest, and most heavily traveled approach. Many hikers, in good physical condition, make this trip in one day; others camp overnight at Marcy Dam or Indian Falls.

The eastern approach via Johns Brook Trail starts at Keene Valley; nine miles long, it passes through a long and beautiful valley with many towering peaks on both sides. The western approach takes the hiker past lovely Lake Colden, the flumes and pools of the Opalescent River and Lake Tear-in-the-Clouds, source of the Hudson River. The southern trail to the summit enters the region at Elk Lake; it passes between Mount Haystack and Mount Skylight and rewards the hiker with a spectacular view of the summit of Marcy rising abruptly out of Panther Gorge.

In closing our brief story we offer a reminder: Mount Marcy is a part of the Adirondack Park and is thus *your* mountain to climb and enjoy. Why not plan now to include Marcy in your travels for next summer? A truly new and unique experience awaits you!

The following publications may help in your preparations:

The Trails to Marcy. N.Y. State Conservation Department Recreation Circular #8. 1961. Directions and information concerning the various routes to the summit; with map.

Guide to Adirondack Trails. Adirondack Mountain Club, Gabriels, N.Y. 1957. A detailed guide to all the trails in the high peak region, including the Northville-Placid trail; with map.

Plants and Animals of Mount Marcy, New York. Adams, C. C. and others. Ecology, Journal of The Ecological Society of America, Apr., Aug., Oct., 1920, 1:71-94, 204-233, 274-288. Scientific papers on the plants and animals of Mount Marcy, stressing their ecological relationships.

Geology of the Mount Marcy Quadrangle, Essex County, New York. Kemp, J. F. N.Y. State Museum Bulletin #229-230, 1920. A detailed description of the rocks, minerals and geology of the Mount Marcy region; with map.

The Adirondack Winter Mountaineering Manual. Adirondack Mountain Club, Gabriels. A guide to winter camping and climbing in the Adirondacks; an important reading for all planning to climb Mount Marcy in the winter.

The Case of the Blue Carp

(*Continued from page* 19)

cavity. Sodium fluorescein produces a greenish fluorescence for a week, while fast green, trypan blue and Pontamine Fast Pink BL last for a few days, two weeks and four weeks, respectively. Trypan blue also leaves a local mark for two months at the point of injection. Pontamine is the best of these dyes since the local mark lasts for as long as a year in some fish and is easily recognized. Both of these dyes color new bone and cartilage in fish — useful for certain tissue studies.

Three dyes have been successfully applied to fish by the dipping technique. Rhodamine B, neutral red and Bismarck brown produce a bright red or brown coloration which lasts for a week or so. Despite the short duration the technique has been useful on the West Coast for coloring and subsequent identification of salmon fry.

Most unique has been the production of blue trout, carp and goldfish by feeding one meal of Sudan Black B. The blue color lasts in diminishing quantities for two months. As mentioned above, such a technique will allow determination of the percentages of a carp population which might eat distributed poison baits. In this study distribution would be made of non-poisonous, dyed baits and several days later a sample of carp would be captured by electric shocker. The percentage of blue fish in the sample would give us the answer. The degree of acceptance of such baits by fish of other species could also be determined. This is equally important in development of poisoned baits that will be selective; i.e., specific for carp.

Coloring by oral dye includes the benefits of mass production, non-handling of fish and the marking of otherwise unavailable populations. Use of such a dye as a tracer in medicated trout food or for marking trout fry or fingerlings before stocking or for food and migration studies among natural populations would be advantageous. Sudan Black B, itself, might not be suitable for the above purposes, because of evidence that it causes tissue deterioration after a period of months.

This "first generation" of dyes has its uses and drawbacks, but the future should reveal a panorama of brightly colored fish, all serving the cause of better fishery management. Thousands of dyes are available and among them (with new dyes constantly being produced) are some which are non-toxic, long-lasting and easily applied.

the back of the book

Boulders

Over a large part of the United States, the only sizeable rocks are boulders scattered over prairies and woodlands or piled in stream beds. A large boulder seems so massive and indestructible that it seldom fails to arouse our interest and curiosity. Where did it come from and how did it get here?

The history of these boulders is as fascinating as the unfolding of a detective thriller. The evidence shows that these rocks were carried by the ice sheets, or glaciers, which slowly pushed down from northern Canada at least four times in the last million years. Grinding and plowing as they came, these masses of ice ripped away pieces of the bedrock over which they travelled. Some of it was pulverized into clay and sand and pebbles but, when the ice melted, chunks of granite and other very hard rocks were left as boulders, often many hundreds of miles from their parent rock ledges.

Boulders are worn or rounded glacial rocks larger than the cobblestones which were once used to pave city streets, roughly between the size of a man's hat and his automobile. Those found just where the melting ice left them often show scoured flat faces and are more angular than those along streams and shores which have been rolled and rounded by the action of the water. Most are granite or granite-like rocks formed back when cooling masses of molten rock floated to the surface. Usually they are gray or pink, occasionally red, black or mottled. A few are metamorphic rocks such as quartzite, schist and gneiss. These show bands which may be regular or variously bent and crumpled. The youngest of all, sedimentary rocks, contain fossils.

Where boulders are numerous, they are a nuisance. In the "boulder belts" farmers often spend years clearing them from their fields. The smaller ones are dug up, rolled onto a heavy sled called a stone boat, and dragged into heaps or piled along fence rows. Larger ones are either broken up, buried below the plow line, or endured. Many a former farm boy bears scars because his plow hit a concealed boulder.

Since pioneer times these glacial boulders have had practical uses. The dams for early waterpower gristmills and sawmills were logs and earth heavily weighted with boulders. Either whole or broken into pieces with sledge hammers, these rocks were used for the foundations of houses and barns or the masonry walls of cellars, spring houses and chimneys. Today, large colorful natural boulders weighing many tons are sought for memorials and as markers for spots of historic interest.—NATURE BULLETIN. *Forest Preserve Dist., Cook County, Ill.*

Unique double

Most hunters consider a double—taking two targets with two quick consecutive shots—as a golfer considers a hole in one. Usually the double involves two similar targets—two ducks, two grouse, quail or what have you. But Don Schierbaum, of the Department's game research staff, threw away the pattern this season while pheasant hunting. His double—a gray squirrel and a Canada goose.

Don and party were crossing a recently cut corn field so barren you could see a meadow mouse if it moved. As they approached a hedgerow, a gray squirrel scurried away. Don collected it with his first shot from his double-barreled. As the shot resounded a big Canada goose stood up like a statue, only 40 yards away in the open field. The second shot collected a goose dinner.

Actually the goose had been wing tipped earlier by some other hunter and perfectly concealed itself by stretching out on the ground to look like just a clod of dirt. The shot at the squirrel brought it upright—and it looked as big as a house.

Bruin takes a walk

When a black bear decides to take a walk, he can really cover the ground.

One of the nuisance bears trapped and tagged at a local garbage dump in the Adirondacks was moved 65 miles away and released. A year later, he was recovered less than two miles from the original capture point. Several other nuisance bears that had been transferred 40 or 50 miles have returned to the exact point of capture and they promptly went "back into business" at the same old stand.

The study has also shown that bears are very skillful in locating food, as evidenced by remarkable gains in weight. Two males, recaptured only three weeks after they were tagged, had gained 81 and 92 pounds, respectively. Another male, recaptured a year later, had progressed from 322 to 562 pounds, a gain of 230 pounds! Generally, the males show a weight gain of about 50 pounds a year during their first four or five years, and they nearly always weigh more than females of the same age.

Hunters, who bag a tagged bear, are requested to co-operate in the research study by sending the ear tags and skull to the Conservation Department with information as to where and when the kill was made. A reward of $25 will be paid.

ESFPA award

A future forester at the New York State Ranger School at Wanakena has been given the Fifth Annual Empire State Forest Products Association (ESFPA) Scholarship Award for 1961.

Timothy C. Tigner of Riverhead, L.I., is the 1961 recipient of the financial grant. He is presently a student at the Ranger School, a division of the State University College of Forestry at Syracuse University. The $200 scholarship will enable Tigner to complete his education.

"The Charmed White Deer"

(*Continued from page* 20)

bor would tickle him mightily and related it, verbatim.

To my astonishment, Joel took it seriously. He thought a minute and then he said quietly: "You are beginning to hunt, just as I am done. I have killed over 1,100 deer. In my best days, I could cut a chickadee's head off about every shot. And one fall I missed six fair shots in succession, all standing. It was just when I was in my best shooting days. How do you account for it?"

I was dumbfounded. I said, "I don't pretend to account for it. And did you, the best off-hand shot in the county, and a man of good education, take your gun to Auntie Johnson to be disenchanted?"

"I have taken my rifle there twice," he said, quietly.

Old Bill D--k was the hardest-headed old sinner on the upper waters of Pine Creek. As the neighbors said, "He didn't believe anything." His experience was a little different from the above. I thought to get up a laugh and some sympathy by relating the foregoing incident, but Old Bill took it seriously and told me how *his* rifle was bewitched by a tall, black eyed, young woman who "came in from below" to cook for Stowell's camp. When he found his gun would not kill a deer under the most favorable chances he took it to Auntie Johnson; and here is his exact statement, taken down at the time: "She loaded the rifle with a silver bullet and told me not to shoot until I got a sure, standin' shot. And to heat the fire shovel red-hot the next morning and plunge it into a bar'l of soft soap, and I would hear from that black-eyed witch down to Stowell's before sundown. Wa'l I did it. I stuck the shovel red-hot inter the soap, and before night the news come up that 'Jet Lee,' that was her name, had give a yell an' tumbled onto the floor just about the time I stuck the shovel inter the soap. There was a big blistered burn on her back, the size and shape of the shovel. My rifle shot well enough after that. It was six weeks afore that burn healed up; and there's livin' people today who will take their oaths to just what I tell ye."

Yes, we are 2,000 years too near our muscular ancestor, the gorilla.

As regards the superstition about "white" deer, it has now reached this section, and is new to me; but I know something of white deer. Why any sensible human being should attach mysterious importance to the color of hair on a deer, weazel, otter, or any other animal, is one of the things I shall never find out.

I ought to be "unlucky." I ought to be drowned three times (I *have* been drowned twice). I deserve all the bad luck that can befall a woodsman—for I have killed two white deer—innocently, not knowing my sin; like the Yorkshire lad who shot an owl, and only found out that he had killed a "cheerybim" by inspecting the tomb stones in the village burying ground.

"White deer are always does." Oh, are they? I killed a buck in Eaton County, Michigan, thirty-two years ago, white as snow. It brought no bad luck that I know of.

I killed a fat doe on Flat River, Michigan, white, with the exception of a gray patch on the shoulder. Twenty-two years ago there were three white deer on Middle Fork; a buck, a doe and a yearling. The two first were milk-white. The yearling had a patch of gray hair on his shoulder. The way those white deer were hazed and chased was a caution to white deer. I took a hand in, and lamed myself, and failed. A long-legged Campbell killed the buck. My pard, Ira Crosby, killed the yearling. I don't know what became of the doe. I suspect she came out blue or gray the next October; for it is a fact that the deer that is white one season is just as likely to come out gray the next as not.

In Addison, Steuben County, New York, I have seen carloads of venison, *en transitu*, and I have seen at least three milk-white bucks on their way to New York. White deer are no myth.

The Olympic Bobsled Run at Mt. Van Hoevenberg

(*Continued from page* 29)

tears but suddenly recalls the message with horror and frantically telegraphs the nerves in your arm to perish the thought. A second message comes through—*wipe your eyes on the driver's shoulder!* This you do and try for a deep breath, but you doubt if you ever got it. Now your sled does a few snap rolls in Little "S" and you look up in time to see the grandstand at Zig-Zag bearing down on you. A prayer begins to form on your lips. It never materializes. The sled cants sharply to the left, high on the Zig wall and drops like an arrow into the gut between Zig and Zag then cants to the right high on the Zag wall. The wind whistles. Your head hugs the driver's shoulders tightly and your ears listen vaguely to the dull roar of the sled rumbling down the mountain. Your body becomes a mesmerized chunk of frozen flesh, swaying automatically to the rhythm of the sled. Your mind ceases to care as your eyes dully try to slow down the blue-green streak pacing you down the run.

Suddenly all is quiet. The noise is gone. The sled has stopped! Yet there remains the sensation of forward speed, urging your body on. As the sled backs off the track, you panic and strain forward to fend off a new disaster. Vaguely your mind comprehends. You're down! A voice urges you to get off the sled. You make a few half-hearted tries but your legs aren't co-ordinated with your mind. You take the hand that suddenly materializes in front of your eyes; and, in a mighty effort, you stand. You stand still for you dare not move. Your knees are all aquiver, feel like putty and your stomach is one big aching knot.

You look up furtively, screwing your frozen taut lips into an uncertain smile (at least you think it's a smile), wondering what sort of picture you are creating in the eyes of your companions. You breathe a sigh of relief because your eyes tell you that they, too, look like you feel. You brave a few hesitant steps and find yourself shaky. All of a sudden the world is rosy again and the thrill of the ride catches up with your senses. Then you utter a weird croaking sound that is supposed to be a happy laugh.

The Olympic bobrun was built by the Olympic Winter Games Commission in 1930 for the Third Olympics and is now operated and financed by the State Conservation Department. The run originally was 1½ miles long and had 26 named curves varying from 6½ to 22 feet in width, the highest of which was Whiteface, some 28 feet high followed by the 22-foot Shady. Today, only the mile run is used with starts at the mile and at the half mile.

To build the run, the Commission hired Stanislaus Zentzytski, the foremost bobrun designer of his time. Zentzytski visited South Mountain (now Mt. Van Hoevenberg) twice to lay out the course and was paid $1.900.10. We have never learned what the ten cents was for.

The actual construction—not counting costs for lighting, water, observation towers, electricity, relay booths, timers, truck transportation and the construction of the bobsleds—$80.000. It takes a crew of 40 to 50 men to get the run in operation, and 35 to 40 men to maintain it during the winter season at a cost of about $500 a day. Nights, the crew prepares the run for the next day, spraying some 20.000 gallons of water on it daily to make the run slick, fast and breathless.

While the bobrun is the only one in America, Europe has nearly two score. There are rumors that new runs will be

built at Squaw Valley and in the Laurentians of Canada but for the present, people in search of a moment of breathlessness can only find that moment coming out of a curve into a straightaway at 90 miles an hour right here in New York State.

Everything about the run is safety first and the Conservation Department is proud of its safety record, for bobsledding is a dangerous sport. To date, no one has been seriously hurt in public riding. However, the accident rate in racing is another story. Luckily, there have been no fatalities in spite of the many skulls that have been dented. Here at Van Hoevenberg your sled drops from the height of a 75-story building at a speed of 90 miles an hour in racing time and at 60 miles an hour in public riding. One sled during the Olympics of 1932 sliced through the tree tops for 110 feet at Shady Corner. That year ten members of the crack German team wound up in the hospital.

For European bobsledders, Van Hoevenberg has a choice spot in their minds. If they remember nothing else about the run, they remember Zig-Zag, the most dangerous curve of the run. If a spill is in store for the racing bobs, it'll happen here; witness the half dozen chilling spills on this curve during the World's Bobsledding Championship in February, 1961.

Grantland Rice was once asked to select four sports, each to represent the epitomy of one attribute—maximum form, accuracy, stamina and nerve. He picked bobsledding at Mt. Van Hoevenberg as the sport calling for the maximum in nerve. The fastest time for the 1½-mile run for the four-man sled is held by Aubrey Wells of Keene Valley at 1:40:40. Mathew ("Buds") Monahan, Jr. of Lake Placid holds the two-man record of 1:53 for the 1½-mile, while Stan Benham of Lake Placid holds the four-man record for the mile at 1:08:88 and Eugenio Monti of Cortini, Italy holds the two-man record time of 1:09:22.

Bobsledding is an adventure in motion and mental anguish. You travel in a topsy-turvy world as the curves of the run become the bottom of the sled and the actual bottom of the run seems to become the walls of the curves. Once you have experienced the rarest thrill in the world of sports—a bobsled ride—it'll either be your last ride or, like a drug addict, you'll be hooked for life. There is no middle ground.

Some one once said, "The nicest part of a bobsled ride is that just as you begin to wish you had better sense, you're down and you can lie your fool head off about how calm you were all the time!"

Winter waterfowl banding

The 1960-61 waterfowl trapping and banding work marks the end of the seventh cold weather banding season—and a strange season it was. Upstate banding of greater scaup broke all records this year with 2,920 birds. The number of "Cans" and redheads banded continued to remain comparatively low. The Seneca Lake Duck Hunters managed to lure 229 "Cannies" and 774 greater scaup, to help rack up the number one station total of 1,003 birds.

Long Island did not escape the cold weather this year. The extended freezing weather turned Cold Harbor into a solid sheet of ice and the experimental floater trap was smashed beyond recognition. Two weeks trapping on the ice did net 209 dabblers, but again the scaup escaped unbanded. A set up on the Carman's River near Brookhaven did, in a relatively few trap days, produce a good number of birds.

In summary, this has been a highly successful year, with the newer banding groups coming through when the chips were down and the going really rough.

Just how important our winter banding has been to the Fish and Wildlife Service from a flyway and continental viewpoint is expressed in a quote from a letter from the Chief of the Section of Waterfowl Population Dynamics: "This is one of, if not the most valuable banding operation in existence, and I would recommend that it be continued." In light of this, we will certainly want to continue our winter banding program and hope that all of the hardy volunteers will be with us again next year.

Here is a listing of waterfowl species banded and their totals:

Canvasback, 548; redhead, 549; greater scaup, 2,920; lesser scaup, 341; black ducks, 1,056; others, 98, or a total of 5,512.

Survival

Man, in his pursuit for the more abundant life, makes the future look dim for some forms of wildlife. It doesn't necessarily mean the extinction of species which has happened to several forms of wildlife in the past, but the numbers are likely to be so reduced that they become biological oddities as far as future generations are concerned.

The passenger pigeon is an example of one species that was considered to be the most numerous bird in the country in the early 1880's. Its complete extinction came in a little over 26 years. The prairie buffalo, once numbered in the millions, was reduced over a period of a few decades to a mere remnant of their former numbers. Today, the whooping crane is receiving special attention in its fight for survival. At last count, their population totaled just 38 birds, including six held in zoos.

During the past century the heath hen, the Carolina parakeet, the great auk, the Labrador duck, the sea mink, the Merriam elk, and the passenger pigeon have become extinct. Birds that are dangerously low include the once common California condor, the largest soaring land bird, only an estimated 60 birds remain; the nene or Hawaiian goose, down to a probable 50 wild birds, and the Everglade kite, on the verge of extinction. The Eskimo curlew, and the ivory-billed woodpecker are believed to be extinct.

Some other birds that can be considered to be on the danger list are the Mississippi kite, swallow-tail kite, white-tailed kite, Hudsonian godwit, Florida sandhill crane, Lay sun teal, Aleutian tern, Florida burrowing owl, peregrine falcon, redbilled hawk, Kirtland's warbler, Cape Sable seaside sparrow, limpkin, flamingo, red dish egret, American egret, snowy egret, roseate spoon bill and the great white heron.

The bald eagle, emblem of the Nation, was once common throughout North America, but now the population is estimated at around 1,000 birds, mostly in Alaska and Florida. The trumpeter swan, world's largest waterfowl, has staged a comeback, but its population is only about 1,000 birds.

There are mammals on the danger list, too. It is estimated that fewer than 800 grizzlies remain, outside of Alaska. The sea otter, tule elk, black footed ferret, kit fox, manatee, key deer, Caribbean monk seal, Sierra big horn sheep, desert mountain sheep, woodland caribou, gray wolf, red wolf, walrus and wolverine are all in danger.

Although extinction or near extinction of many species can be attributed to man and his activities, it can be presumed that certain forms would have been doomed anyway by conditions beyond man's control. Certainly, this was true for many forms of life before man appeared on the scene.

Wood and people

Men and women, who make useful items from wood, manage wood product factories and who put up the money to build such factories, make up the fourth largest industrial complex in the United States. There are 57,000 separate establishments, 1,375,000 employees and a $5.6 billion annual payroll. They make more than 5,000 different products from wood.

Freak frog

Most frogs get around extremely well on four legs, especially with the hind ones so well developed for jumping.

This one, caught by David Ralson of Constantia, was even better equipped—it had three hind legs.

Looking ahead

"Soil Conservation in a Dynamic Society," a paper by Marion Clawson, outlines many interesting challenges for the future. Here are a few abstracts that may interest readers:

"Basic to future soil conservation programs are some pertinent general dimensions of the future. We have 180 million people in the United States today; we may easily have 310 million by 2000. . . .

"Economists as a group are convinced that future increases in real income are certain; the only difference among them concerns the rate of increase. A likely estimate is that in the United States average per capita income in the year 2000 will be double what it is today—$4.000 then compared with $2,000 now—and this in terms of the same prices. . . .

"A century ago in the United States, the average work week was 70 hours; now it is less than 40. We have cut the working day from 10 hours or more to 8 or less; and the work week has been cut from 6 or 7 days to 5 or even less. . .

"In the United States, travel per person annually by all means averaged about 500 miles before the first world war; today, it is about 6.000 miles. By 2000 the average travel per person annually will be about 9,000 miles. . . .

"In the past 50 years, total agricultural output in the United States has doubled from a slightly smaller crop area, with a substantially smaller labor force and with only small additional amounts of capital. These years, and more particularly the last 20 years, can fairly be called the Agricultural Revolution. . . .

"If urban population is going to double in the next 40 years, then urban land area must necessarily increase. From about 17 million acres in urban uses in the United States in 1950, the area will increase to 41 million acres in 2000. . . .

"This covering of fertile soil with street pavement and dwelling structures has distributed many agricultural people. However, it is necessary to preserve some sense of proportion. Present urban area in the United States is less than 1 per cent of total land area; even the prospective increase during the next 40 years will require less than 2 per cent of total land area. . . .

"More people with higher incomes and greater leisure, along with increased travel, will create a demand for more outdoor recreation; taken together, their impact may well be staggering. The total demand for outdoor recreation may increase 10 times over by 2000. . . .

"In agriculture there is a race between the scientists and engineers on the one hand, whose works lead to greatly increased productivity and hence greater supplies of products, and the stork on the other side, who adds to the demand for agricultural products. My bet is on the scientist and engineer. . . .

"For the large areas of forest and grazing land, the situation is roughly similar to that for crop land. We cannot increase greatly the area of either land use; in fact, each is likely to shrink slightly in total area as other uses take over some of the land presently in forest and range. On the other hand, demand for lumber, pulp and other forest products will rise considerably; so will demand for beef, lamb and wool that may be raised on grazing land. . . .

"But often overlooked are the many rural dirt roads abandoned, as farms, ranches and forest lands are formed into larger holdings and as remote residences are abandoned. The total area used for all forms of transportation in 1950 was 25 million acres; I estimate the figure will be 30 million acres by 2000. The area in reservoirs is likely to increase from 10 million to 20 million acres in the same period. . . .

"First of all, in the United States we face tremendous changes in the number and size of farms. In 1920, there were 6½ million farms; now there are but 4½ million. This is only the beginning of the adjustment process. By the year 2000, it is doubtful if we shall have as many as 1 million farms. . . .

"Future problems in soil conservation present a challenge; but life consists of meeting challenges successfully. It may be necessary to modify some old methods and to devise some new ones. But there is no basic reason why the problems of the future should prove more difficult than were the problems of the past. . . ."

NOTE: *Reprints of Clawson's paper, "Soil Conservation in a Dynamic Society," presented at the Fifteenth Annual Meeting of the Soil Conservation Society of America, may be obtained from* the Journal of Soil and Water Conservation *(Vol. 16, No. 1, Jan.-Feb., 1961), 838 Fifth Ave., Des Moines, Iowa.*

Hybrid poplars

New types of faster-growing hybrid poplars are being developed which are expected to multiply the wood yield per acre by three to six times. The Ontario Paper Co., Ltd. has a hybrid program that was started in 1951. Now, it has two plantations covering a total of 120 acres and containing 93 different hybrid types, most of them imported from Europe.

One Italian hybrid has grown in eight years to a height of 46 feet with a diameter at breast height of 8.4 inches. By the time, it is 15 years old, it is expected to be 60 feet tall with a diameter of 12 inches. Company officials hope to harvest the hybrids for pulpwood at the age of 15 years. This would compare with a rotation of 40 to 60 years for native poplar. Wood yield per acre is expected to be three to four cords annually, against less than a cord for native poplar.

Utilization of poplar is, in fact, one of the problems facing the forest industries. Poplar frequently takes over forest land temporarily when the valuable softwoods are cut. There is little demand for the wood, although it is the preferred species for a few applications, including matchwood and some types of pressed-wood sheets. It is less desirable than pine or spruce for lumber, however, and it cannot be used in large quantities in most North American newsprint mills.

Poplar, because of its fast growth, has long been an important wood in Europe. There is even an International Poplar Commission, organized in 1947 under the sponsorship of the Food and Agriculture Organization of the United Nations. The commission has 21 member countries, mostly in Europe and the Middle East, but including Pakistan and Argentina as well. Most of these countries also have national poplar commissions to promote the study and culture of poplars.

Boys' camps

More than 1,500 teenage boys attended the Conservation Department's four conservation education camps this past summer. They have our thanks and congratulations for their active interest in helping to promote wise use of natural resources. A great deal is heard and read about the teenage boys who get into trouble; we infrequently hear enough about the vast majority of youngsters who are trying hard to be good citizens.

The Department's camps, operated during July and August, provide instruction in soil, water, forest, fish and wildlife conservation and outdoor living to boys 13 to 15 years of age. These boys spend a week at camp under the sponsorship of sportsmen's clubs or other civic organizations. Camps are located at Ray Brook (Essex County), Raquette Lake (Hamilton County), De Bruce (Sullivan County), and Rushford (Allegany County). This year's attendance of 1,511 was the largest since the program began in 1947. It brings total attendance thus far to well over 15,000 boys.

Foxes up a tree

The gray fox is the only fox that can readily climb trees. When pursued by dogs it sometimes leaps into the branches, bounces from limb to limb and then hides quietly in the thick foliage.

Then and now

A group of ornithologists from the Buffalo Ornithological Society made a breeding bird survey of the Oak Orchard Game Management area. The results were interesting because just 25 years ago members of the Society had made a similar survey prior to the Conservation Department's acquisition of the area and its development for waterfowl management, inclusive of diking for shallow water impoundments.

Here are some excerpts from the survey report showing the changes that have taken place:

"In general, it was apparent that mallards have increased greatly in numbers, while at the same time the black duck population has suffered a big drop. Blue-winged teal, formerly second in number to the black duck, are even more common today than a generation ago. The wood-duck, a hole nester, seems to be only slightly reduced in numbers. We were much impressed with the increase in the number of green-winged teal. Only one brood of green-winged teal was noted, and one nest with eggs found 20 years ago, whereas there may have been as many as 15 pairs in the area this year.

"A new nesting species in the swamp is the ruddy duck. Snipe appear to have held their own, while woodcock may have slipped. The most notable decrease was in the rails, and it appears that the water is too deep over much of the marsh to furnish a satisfactory habitat for these marsh birds. On the other hand gallinules and coots seem to adapt themselves readily to the deeper water, the former holding its own, while the latter has shown an increase over the years. Bitterns are noticeably lower in numbers, while other herons have held their own.

"Very little time was spent on the land birds, but we could not fail to note the almost total absence of the northern waterthrush which used to be common along Oak Orchard Creek. The prothonotary warblers, which had quite a colony in the Thirties along the creek to the west of the Knowlesville Road, have taken over the dead trees along the dikes to the east of that road, and also to the south of Stafford's Pond. We found 10 singing males."—H. D. MITCHELL, *Buffalo*

Conservation poster

The 1961 Conservation Poster Contest, sponsored by the Conservation Forum of New York State and by the Buffalo Museum of Science, has again been acclaimed a success.

The contest is open throughout the State to public and private schools, from grades 5 to high school, with a closing date of March 31. Cash awards are given for winning posters.

Information on rules can be secured from the Forum's headquarters at the Museum, Buffalo 11.

Long Island wetlands

Fourteen thousand acres of Long Island wetlands, located in the Towns of Hempstead and Oyster Bay, have been recommended for preservation because of their "inestimable value" to sport and commercial fisheries and to waterfowl. A special report, prepared jointly by the State Conservation Department and the U.S. Fish and Wildlife Service, following a three-year study of the area, has shown these irreplaceable wetlands and the multi-million-dollar resources they support to be threatened with destruction as a result of urban and industrial development. Dedication of these lands for fish and wildlife conservation purposes will make the towns eligible for State aid under provisions of the Long Island Wetlands Preservation Act of 1959. This law authorizes the State to pay all the development costs and 50 per cent of operating and maintenance costs on these lands.

The problem of disappearing wetlands exists throughout the entire State, but it is especially critical on Long Island where more than 4,600 acres of valuable wetlands have been destroyed, just during the past six or seven years. The shoal areas of Great South Bay, Long Island, with its marshes, mud flats and tidal shallows, is one of the most important coastal waterfowl areas in the North Atlantic States and the Hempstead and Oyster Bay wetlands make up a major part of this valuable area. These marshes also provide a highly productive habitat for shellfish, and are used as spawning, nursery or feeding grounds by more than 60 species of fish including flounder, striped bass, weakfish, kingfish and sea bass.

Here, the survey recommends development of two refuge areas, improvement of waterfowl habitat, provisions for better public access to fish and wildlife areas and the protection of the wetlands against pollution and dredging.

Reforestation by air

The sowing of tree seeds from helicopters and airplanes has been made economically feasible in recent years by treating the seeds with a substance that is a repellent to birds and animals.

Direct seeding by air has several advantages over planting seedlings. Costs can be as little as $7 an acre where hand-planting would be $25 or more for each acre.

Direct seeding is fast; with a helicopter moving 45 miles an hour while broadcasting seed, it can seed as much as four acres a minute.

Brook trout

The brook trout has been around New York a long time, probably "pushed down" from the Arctic by encroaching ice during the glacial period, more than 10,000 years ago. When the glaciers finally pulled back and the North American "icebox" began warming up again, the trout stayed on in the colder streams.

Indians, who lived in the area, depended a great deal on trout fishing as did the early colonists. But by the late 1800's, the brook trout were in real trouble. Extensive cutting of trees had resulted in erosion and the widening of streams. With the shade gone, the water began warming up. Factories and settlements along the waterways brought pollution and there were dams to contend with. The trout found themselves existing in silt-laden streams racing their course unchecked, never slackening for the pools or eddies required by any self-respecting trout. With the coming of the "horseless carriage," roads were built—usually in the natural highways that followed the stream valleys—and fishermen could drive to the trout's very doorstep.

When trout numbers began to drop, anglers to "restore good fishing" imported other species of fish like perch, pickerel and bass. This was the coup dé grace in many trout ponds, because the introduced species began competing with the trout for food and also preying on the trout fry and fingerlings (see "Cranberry Lake," June-July, '61). Since 1926 the Conservation Department, through its program of biological surveys, research, habitat improvement and stocking, has put the brooky back in business in many waters of the State. Its Stream Improvement Unit has worked on hundreds of miles of public fishing streams and the Department has reclaimed more than 100 trout ponds and lakes throughout the State by getting rid of the undesirable species. Last year alone, it stocked more than 2,200,000 brook trout that ranged in size from one inch or under to seven inches and that tipped the scales at more than 72 tons.

The brook trout are here to stay but with the progress of civilization, they're still going to need all the help they can get.

Oldest gun dog

The English setter is America's oldest gun dog. Long before his short-haired rival, the pointer, came into popularity, the English setter was proving a prime asset to hunters wherever American upland game birds were found.

Ray Burmaster

Ray L. Burmaster, well known District Game Protector of the Saranac Lake Division, passed away on September 13, 1961. Ray retired from the Department in January of 1956 after 40 years of continuous service in the Bureau of Law Enforcement. He received his first permanent appointment in 1915, in Erie County, and his promotion to District Game Protector of the Saranac Lake Division in 1920 where he served until his retirement.

The Game Protectors' School was, for a time, directed by Ray.

He will be remembered with respect and admiration by the public whom he served and by his many friends and fellow conservationists.

Schoolroom zoos

The main difference between animals in a zoo and animals on a farm is that, although both are confined behind fences, in cages or are under the daily care of man, zoo animals are kinds that normally live wild and free while our farm animals are domesticated.

Our farm livestock, such as horses, cattle, sheep, goats, hogs, ducks, geese, chickens and turkeys—as well as our dogs and house cats—were all brought under domestication by ancient man, mostly before the dawn of history. Over the ages, by artificial selection, these have been tamed and changed so strikingly to fit man's needs, whims and way of life that they are seldom able to survive and breed in the wild.

Birds, mammals, reptiles and other wildlife are kept in zoos, not because they work or produce meat, milk, eggs or other products, but to satisfy our curiosity and teach us about the animals in other parts of the world.

But it is not necessary to bring animals from the ends of the earth in order to become skilled zoo-keepers. It can be done in your schoolroom with the common, small, wild animal life of this region. A few small terrariums, acquariums, cages, boxes and jars in the "science corner" or on the "science table" of a schoolroom can house a dozen or more different ones which can be fed, cared for and studied. Just as some gardeners are said to have a "green thumb," some people are more successful than others in the care of animals because they are close observers, use their ingenuity, care for and understand their pets.

Frog tadpoles are favorites. Kept in a small aquarium or jar of water, they are hardy and easily fed on algae, bits of lettuce leaf and other plant material. Of the several local species of frogs, all but the green frog and bullfrog go through their entire tadpole stage and transform into small adults during their first summer. Green frog tadpoles are best because they can be collected from ponds in autumn and watched during the school year as they grow legs, absorb their tails and change over from gill-breathing tadpoles to lung-breathing, flesh-eating adults.

The habits of any of hundreds of kinds of insects, both land and water species—how each eats and breathes—can be watched in the classroom. A wide-mouthed bottle with a chunk of overripe banana and a strip of paper towel will attract and breed the fruit flies which have been used so widely in the study of heredity. All stages of their life cycle—eggs, larvae, pupae and new adults—can be seen within two weeks. Ground crickets can be reared in a gallon jar with an inch of damp sand and fed on bits of lettuce and oatmeal paste smeared on small pieces of paper.

The variety of native animal life suitable for the schoolroom zoo is very wide. Among the vertebrate animals are adult frogs, toads and salamanders; small snakes and turtles; such small fish as bullheads, sunfish and minnows; and even wild deer mice which, incidentally, do not smell "mousy." There are also crayfish, snails, leeches, earthworms and a host of others which can be collected.

Now, with the beginnings of space travel a reality, earth-bound man is dreaming of new worlds to be discovered and colonized. Whether such a world already has life, or whether man will take earth's plants and animals with him, the process of domestication must certainly be repeated. Then, the skills learned in the "science corner" of your schoolroom may be all-important.

Horsetails and club mosses

Just for fun, sometime, lie on your stomach in a patch of long grass or weeds and remain perfectly still, but watchful. Pretend that you are a tiny person—like Alice in Wonderland—lost in a jungle of towering trees. It is easy to imagine that an ant is a terrible dinosaur, that a worm is a huge snake and that grasshoppers are gigantic flying dragons.

If you try that stunt in a patch of those queer flowerless plants called horsetails, or in a bed of the equally primitive club mosses, you may get some idea of how the landscape appeared during the Coal Age, 300 million years ago.

Then this earth had a warm, humid tropical climate and vast portions of it were swamps choked with fantastic types of luxuriant vegetation. There were tree horsetails, 60 feet tall and almost identical—except in size—with their small descendants we see today. There were treelike club mosses, one of them attaining a height of 100 feet. There were great seed ferns—now extinct, tree ferns, and an understory of true ferns among which there were some kinds 15 or 20 feet tall.

During millions of years, as that vegetation lived and died and fell into the swamps, it accumulated and gradually changed to peat. Eventually, with tremendous pressure exerted by layers of rock poured or folded on it, the peat became coal. The fossil remains of giant horsetails, club mosses and ferns are frequently found in thick veins of coal deep underground in Illinois.

Our modern horsetails are easily recognized by their jointed hollow stems, each section fitting snugly into the one beneath it in much the same way as lengths of sewer pipe fit into each other. The species most common here occurs in damp sandy places, on worn-out clay or gravelly soils, and especially on railroad embankments. It is an annual plant—it comes up anew, completes its growth, and the stems above ground die back each year. It sends up two kinds of stems; one that bears spores and another that is sterile.

One of the first signs of spring is when the tan-colored fruiting stems appear. They grow rapidly to a height of from 6 to 12 inches. On a stem, at each joint, there is a sheath of small pointed scale-like leaves, black or dark brown, that lie flat against it. At the tip there is a yellow cone crowded with scales which soon open and release clouds of dust-like spores.

When a fertile stem begins to wither, the roots send up a green, jointed sterile stem that lives until autumn. At each joint there is a whorl of small needle-like stems, also green and jointed. It looks like a little pine tree but when one droops downward it reminds you of a horse's tail. Muskrats and deer are said to relish the horsetails that grow in and around swamps but the chief value of these plants is that they develop branching nets of roots at or just beneath the surface of the ground. They anchor the soil, preventing wind or water erosion.

Scouring rushes, closely related to the horsetails, although similar in most respects, are evergreen perennials—they live from year to year. A common species, which grows in clumps along streams and the borders of swamps, has dark-green jointed stems from 3 to 8 feet tall, with longitudinal ridges. The sterile and fertile stems are alike but the latter bear cones. They are strengthened with bands of gritty material—fine particles of silica—and in pioneer times were used to scour pots and pans.

Club mosses are little evergreen plants with trailing stems from which grow erect shoots that, on some kinds, resemble tiny trees. Covered with moss-like leaves and reproducing from spores, they prefer cool deep forests and are rare or extinct in this region.—NATURE BULLETIN, *Forest Preserve District, Cook County, Ill.*

Ed. Note: See feature article and centerspread pictures of "Some Mosses of New York," June-July, '61 issue.

Bear—trapped

A 40-pound black bear cub stepped into a coyote trap near Bloomingdale in Essex County and was "sprung" after an exciting wrestling match on the forest carpet with three men bent on releasing him.

The cub, it seems, had been attracted by thoughts of a snack of juicy apples in an old orchard where a local trapper had made a set for coyotes. The trap, into which he ambled, was securely anchored, and the young bear was unable to pull loose no matter how he tried.

Game Protector Paul Benoit was called to help release the cub and to protect the other men should the mother bear arrive to help her hapless offspring.

The three men converged on the cub, who made unmistakable signs of resenting their presence. A noosed stick was used to hold the animal while the trap was being released. The little bear's fury was all too evident to bystanders who backed off to give the black ball of dynamite plenty of running room when it was finally free.

Once on all fours again, the bear scampered for the nearby woods, little the worse for his experience.

Boating aid

State aid grants to 35 counties which conducted State navigation law patrols during 1960 amounted to $203,235. These grants are the first under the provisions of a series of new laws relating to safe boating, passed by the 1959 Legislature and approved by the Governor. They are paid from the Motor Boat Regulation Fund, comprised largely of fees received from boat owners for registration of their craft. The law requires that half the income from such fees be set aside for the grant-in-aid program. Grants to an individual county is limited to a maximum of $50,000.

The 35 counties, including the five counties of New York City, are among 42 that conducted navigation patrols during 1960. Counties not receiving State grants are, for the most part, those which conducted patrols with volunteer officers or that began patrol activities after county budgets had been drawn.

The stepped-up navigation patrol program, along with increased boating education and safety activities of the Division of Motor Boats, appears to be a major factor in reducing boating accidents within the State. During 1960, when county enforcement agencies reported a total of 1,134 arrests for navigation law violations, boating deaths were held to 70—only one above the 10-year low set in 1958. Fatalities dropped despite increased boating activity. So far this year, preliminary reports show a total of 54 boating deaths; a little under the 60 reported at the same time last year. Forty-four counties are now taking part in the State navigation grant-in-aid program.

Rainbows

Rainbow trout, hailing originally from the west coast of the U. S., are the most migratory of all trout.

Fort St. Frederic

Fort St. Frederic, on the Department's Crown Point Reservation (Essex County), is now a "registered national historic landmark." A certificate to this effect has been made by the Historic Sites Historian of the National Park Service and states that Fort St. Frederic "possesses exceptional value in commemorating and illustrating the history of the United States."

Fort St. Frederic was built by the French in 1730-31. It was blown up by its retreating garrison in 1759 as the British advanced on the stockade. The ruins of the fort are located on the 103-acre Crown Point Reservation on Lake Champlain which is maintained by the State Conservation Department as a public campsite and day-use area for bathers and picnickers. It is one of a few hundred sites selected as national historic landmarks following a National Park survey of thousands of historic sites and buildings throughout the country.

Little Frenchman, the National Open Pheasant Dog Champion

National field trials

Five national field trials were held on two of the Conservation Department's game management areas operated by Region No. 3. Four of these were for pheasant dogs on the Three Rivers Game Management Area near Baldwinsville. Robert Wehle, son of former Conservation Commissioner Louis A. Wehle, was owner and handler of Elhew Huckleberry, the Open Shooting Dog Champion and the only New York State dog to win a title. Mrs. A. H. Nitchman of Cranbury, N. J. showed field trials aren't just a man's game by running her own dog, Potato Patch Sue, to the championship of the Amateur Pheasant Shooting Dog Stake. Another woman, Mrs. Claudia Phelps, from Aiken, South Carolina, owned the winner farthest from home. Home Run Johnny, the Futurity Champion. Little Frenchman, handled by Phil Brousseau, was declared National Open Pheasant Champion.

For the fifth time since 1949, the Grand National Grouse Dog Championship was held on the Conservation Department's Pharsalia Game Management Area. Sam Light of Punxsutawney, Pa., whose Sam L's Skyhigh was the first champion at Pharsalia, came through with his second championship there when his defending champion, Sam L's Rebel, was declared winner over the best grouse dogs from Maine to Michigan.

In addition to playing host to national field trials, the Conservation Department has furnished pheasants for use at many local trials around the State. The development of good hunting dogs, not only to locate game but to help recover cripples, is of interest to conservationists. The recreational time spent afield while training a gun dog adds immeasurably to value received from hunting.

Tree seedlings go up

The steadily rising costs of operating the Conservation Department's tree nurseries has made it necessary to increase the price of seedlings available to the public for reforestation of private land from $5 to $10 per thousand. The change will be effective with orders taken this fall. Operating expenses at the State's three nurseries have more than doubled since the end of World War II but despite the price increase the trees are still "a bargain." The actual cost of production is at least $13 a thousand.

Good conservation on private lands is certainly in the public interest and seedlings have always been sold at less than cost to promote good forestry practices. Forest cover on any lands helps protect the watershed and prevents soil erosion, and, in addition, produces needed timber, frequently with a Christmas tree bonus.

Under State law, the Department may sell the seedling trees raised at its nurseries at a price not to exceed the cost of production. The law also specifies that the trees must be used for reforestation, not for landscaping or other ornamental purposes.

During the coming year, an estimated 36 million seedlings will be available to the public from the Department's three nurseries located at Saratoga Springs (Saratoga County), Lowville (Lewis County) and the Oak Orchard Game Management Area (Genesee and Orleans counties). They will be sold in lots of one thousand for delivery this fall or in the spring of 1962.

Species available include white, Scotch and red pine; Norway and white spruce; balsam and Douglas fir; Japanese larch, black locust and Japanese black pine (the species recommended for Long Island). Order blanks may be obtained from the local District Forester.

Air pollution

A study by the State Department of Health shows that although no direct relationship between chronic respiratory diseases and air pollution exists, circumstantial evidence points to some association.

The pneumonia problem, for instance, is a complex one with many factors bearing on incidence and deaths from this disease. The natural history of the disease also varies with time and place. New York City's pneumonia death rate rose from 31.5 per 100,000 population in 1949 to 50.6 in 1959. In eleven upstate cities —Binghamton, Buffalo, Elmira, Rochester, Niagara Falls, Utica, Syracuse, Troy, Schnectady, New Rochelle and Yonkers—where measurements indicate a lower level of pollution, the death rate was 23.9 per 100,000 in 1949 and 38.6 in 1959. In non-metropolitan areas where there is light air pollution, there was also a rise but at a lower level, from 16.9 to 29.2, during this same period.

Deaths recorded in New York City show an increase from 0.9 to 5.0 per 100,000 from 1949 to 1959 from emphysema alone. In upstate New York, covering many rural as well as urban areas, the rate changed from 0.1 to 2.2. The levels are lower than for New York City, but the rate of rise was much greater, possibly related to increased urbanization.

Clam salad

An especially desirable food for shellfish larvae is sea lettuce, ground and frozen. Shellfish fed on this diet reached an average length of 165 microns (1/1000 of a millimeter) at seven days and began setting on the ninth day. Young clams reached a maximum length of 500 microns one month after fertilization with no unusual mortalities when treated to a diet of frozen sea lettuce.

Bear damage

Bears will bite and pull off strips of bark from the trunks of pine, spruce and fir trees, often girdling and killing the trees.

"Bibliography of Hydrometry"

Water fundamentally is the most important resource we have today. It is the life blood of the soil. Without it, we would cease to exist. Ask any conservationist about the importance of water and you'll get an answer that might flow in one ear and out the other. Ask a housewife who has spent a frustrating day without water and you'll get a more forthright answer—probably one that you won't forget.

Scientists the world over have been studying and puzzling over water for a good many centuries. More important, they have been writing about it since 1827 B.C., the earliest written hydrometric record found to date.

These writings, their whereabouts, and what they are about—some 7,370 of them in more than 30 languages—have been set down in a tremendous and most welcome volume, "Bibliography of Hydrometry," a culmination of 45 active years in the field of hydrometry by Dr. Stepanos Kolupaila.

Following a brief chapter on the historical development of hydrometry through China, India, Babylon, Egypt, the Roman Empire, and Central America, to the present day, there is a chapter on compendiums, handbooks and textbook manuals, water stage observations, water stage computations, runoff determination, hydrometric instruments, rating of hydrometric instruments, equipment of hydrometric stations, area-velocity methods, velocity methods in conduits, tracer methods, the Gibson method, volumetric measurements, orifices and nozzles, orifice plates and nozzles in pipes, venturimeters, weirs and flumes, modern physical methods of flow measurement, mechanical water meters, slope-area method, depth measurement, hydrometry of tidal waters, sediment measurements, hydrometeorological measurements, measurement of properties of liquids, source material and a bibliography of other bibliographies in the field of hydrometry coupled with a code of libraries and errata that have been found.

Each item has a running number on the margin accompanied by a symbol referring to the language in which the item is written and all items are in chronological order where possible. Each item contains a short descriptive paragraph with cross references. In addition, there is an author index of 4,500 persons.

While this listing on published works is by no means complete, it can be said that the volume is practically 100 per cent accurate in reportage for 90 per cent of the titles listed were seen and described from the original texts.

Dr. Kolupaila, author of the bibliography is Professor of Civil Engineering at the University of Notre Dame, and deserves a well earned "Conservation E" for excellence. His book will be a valuable reference for foresters, game biologists, engineers, soil conservationists, hydrologists and students of natural resources.

This publication is available from the Notre Dame Press, Indiana, 975 pp., 1961. Price $10.—Nick Drahos

Ranger Brewer retires

After 30 years of continuous service, Forest Ranger Earl N. Brewer of Middletown, retired on August 10, 1961. For three decades, Ranger Brewer was a devoted public servant and pioneered in forest fire control. Stationed in Orange County, he was often summoned to assist in controlling bad fires in the Adirondacks as well.

Fire control was in its infancy when he first went on duty and organization and equipment were limited or non-existent. He and his associates did a magnificent job in building up forest fire control techniques to their present levels of efficiency. One of the first to use radio in the suppression of forest fires, he holds one of the earliest communications licenses.

The Department and the public are grateful to men of his type, and appreciate the strength, endurance, and devotion to service which characterizes them to this day.

Upon his retirement, Earl and Mrs. Brewer were honored at a dinner at the Black Bear Inn in Sparrowbush given by the Rangers, Observers and staff of District No. 13. There, he was presented with certificates of appreciation from the Conservation Department and from the Rangers' Chapter of the Civil Service Employees' Association.—A. H. Walsh

Upland Farm—Winter

The frosty half moon in the west is low:
Long shadows, where the rabbit runs the snow,
Curtain the red fox; the barred owl wings
Silently thru the night, and no bird sings.

The dog house by the spring is domed in white,
The spreader is a shining ivory mold
The gabled barn, hip high in drifts, is bright
With icicles that twinkle in the cold.

Within the barn the stanchions twist and squeal
Horns clicking as the cattle toss and kneel,
The horses shift and stomp, and snort and sigh,
In steamy dark the winter night goes by.

Below the pines, the house stands winter struck,
With banked up earth, and fire wood to buck;
Each little window crossed with snowy bars,
And red geraniums staring out at stars.

—K. O. Wilson

Landowners' complaints

A recent Conservation Department survey of 1,300 farmers in Schoharie County indicated that landowners, 2 to 1, would like to have sportsmen ask permission to hunt on their property. The survey was conducted in co-operation with the County Extension Service and the Regional Fish and Wildlife Management Board.

Bad manners are rated as the No. 1 objection to hunter habits and is probably typical of landowners' attitude throughout the State. Their list of objections include trespassing, parking in driveways leaving gates open and littering with beer cans and other refuse on the landowners' property. Shooting too close to farm buildings was another major complaint of the landowners. This, of course, is a violation of the law if within 500 feet of buildings.

Deer hunters seem to cause a majority of the problems. Landowners rated grouse hunters as good sportsmen and least troublesome.

Letters to the Editor

Arctic owls

Gentlemen: We live near Chaumont on Three Mile Point on the Three Mile Bay side. Nearly every night of the year we ride around the Point. During the winter some Arctic owls moved in (five that I am sure of). They are creatures of habit and we usually found them on the same tree tops or posts every evening. I have enjoyed watching them very much but they have just about cleared this point of small game, especially the pheasants (several) and Hungarian partridge (of which there were 17 last fall and none now). They have killed two house cats that the farmers are sure of and probably more.

We know that they are protected but can we do anything to protect the other animals?

(Mrs.) R. C. Callahan Chaumont

• *The problem of predators is not as serious as it sometimes appears locally. You remarked that the owls have killed two house cats and probably more, but what protection do the birds have from the house cats, since they are year-round predators as compared to the Arctic owls which are winter birds and do not even arrive every winter?*

It is too easy to forget the beauty of the hawks and owls and their wonderful adaptations for their way of life. It must be remembered that predators are the "doctors" of wildlife. A sick bird cannot go to a doctor; if it has a serious contagious disease it will pass this on to other members of the same species and thus whole flocks may be eradicated. However, a sick bird is much more helpless before the attack of a predator and is almost certain to be removed from the flock before the contagious disease is spread or at least before it spreads very far. Thus, for the price of one or two sick or weakling birds, the flock, or the species, survives in the area.

As to what you can do to help protect game birds from predators—you might build shelters along the edge of your property for the wildlife. Corn stalks serve as shelter and rough low lean-tos of brush are also excellent shelter devices. Occasionally, the birds and other animals attacked by a hawk or cat dive underneath and escape the onslaught.

There is one other factor in such a situation. The birds which survive the winter attacks are usually the hardiest and best adapted, their young will have the advantage of better parents and will also certainly replenish the population.

The Arctic owl is used to Arctic conditions, mainly in treeless areas. They love situations where, even from a low perch, they can survey wide areas for a careless mouse, partridge or even a house cat. The house cats were probably taken in the area because they also find it ideal for hunting purposes for the same reasons as the owls. I know, to some people, this attitude may be hardhearted but masses of observations by naturalists all over the world have proven that the above facts are true and that predators are an important part of the conservation picture.—E. M. Reilly, Jr., Curator, Zoology, N.Y.S. Museum and Science Service

Alewives on ice

Gentlemen: Last winter, while ice fishing near here on the St. Lawrence River, we saw hundreds of small fish frozen in the ice. All of us, who saw these fish, were very perplexed as we had never seen them in the river before. They ranged in length from one to six inches, with a girth of one-half to one and one-half inches; they have the same coloring as the common shiner. We found literally hundreds of them.

Could you possibly identify these fish and tell us why they were trapped and frozen in the ice?

Larry Mintzer, Ogdensburg

• *From the description it is virtually certain these fish were alewives* (Alosa pseudoharengus). *They are also known as sawbellies.*

There are millions of these in Lake Ontario living as a "landlocked" population. Normally this species is marine but spawns in rivers along the Atlantic coast. Landlocked alewives are subject to mass mortalities and die in large numbers in various waters. However, the usual time of such mortalities is early summer and it is unusual to have them reported dead in winter.

There is considerable evidence that the usual cause of these mortalities is physiological in nature. These fish seem to be very delicate and perhaps any change in environment might cause some of them to die. For example, perhaps these fish normally winter in deep water of Lake Ontario where temperatures are well above freezing but if swept down the St. Lawrence would be subjected to low temperature coupled with a stronger current than they could cope with at that temperature. This is merely mentioned as a possibility.

Several other species of the herring family other than the alewife are subject to mass mortalities. Also experience in transporting these fish in tanks indicate they cannot stand conditions readily tolerated by more rugged types of fish.—John R. Greeley, Chief Aquatic Biologist

Co-operation

Dear Sirs: For many years I have spent a considerable part of my life in the out of doors. I have fished and hunted in many parts of the State. At the present time, I am a member of the Boulder Camp Fish and Game Club and for the past 10 or 12 years we have fished and hunted in the Saranac region.

I would like to take this opportunity in behalf of all the members of the Club, to extend our thanks and appreciation to the staff of conservation men at Ray Brook for their co-operation and willingness to aid us whenever we called upon them, especially Jim Bickford of the Middle Saranac Lake Region.

On one of several occasions during the fall hunting season, one of our fellows was taken ill while tenting on Round Pond. We at home made a call to Ray Brook stating the situation and within four hours, Jim Bickford was in to see if he could help in any way. In our estimation he is one of the finest. It is men like Jim who give the Conservation Department the fine reputation it has today and encourage sportsmen to want to help in any way possible for a bigger and better Department.

R. E. Frederick, Scotia

Ferrets

Dear Sirs: Can you tell me on what date it became illegal to use ferrets here in New York State?

James Reed, Lockport

• *Hunting rabbits with the aid of ferrets was finally prohibited throughout New York State in 1912. Thereafter, ferrets could be used only under permit for rabbit damage control purposes.* —*R. B. M.*

Dog-leg boundary

Gentlemen: As a long-time follower of THE CONSERVATIONIST, I know that you folks are a repository for all sorts of curious information. So this question may or may not be in your bailiwick; if not, perhaps you could advise me where to look further.

I understand that the New York-New Jersey boundary between the Hudson River and the Delaware River is defined on the ground by milestones set out in 1774 and 1882. According to the New York Walk Book, the line, while supposedly straight, is actually a dog-leg due to the local attraction of the highlands' iron ore on the compass used in the original survey of 1774.

As an exercise in cross-country by map and compass, with an added historical touch, I would like to take my Scout Troop along the boundary this fall, in the Suffern-Sterling Forest-Greenwood Lake area. In the presence of local magnetic deviations we will be not better off than the original surveyors, and doubtless, worse. Could you, therefore, refer me to any source of information on true courses for the various sections of the line and possibly locations of the milestones?

W. Deane Lamson, West Caldwell, N. J.

• *You are correct in your understanding that the New York-New Jersey state line between the Hudson and Delaware rivers is marked by milestones set in 1774 and 1882. The monuments along this line are of five classes and consist first of the original mile monuments erected in 1774; second, the new mile monuments; third, the railroad monuments; fourth, the wagon road monuments; and fifth, the terminal monuments, all of which were placed by the Joint Commission in 1882, except the original monuments of 1774. These monuments were re-examined in 1890 and again in 1893 by the State Engineer and Surveyor and are described with respect to appearance and location in the State Engineer's reports for those years.*

The new United States Geological Survey Maps of the 7½ minute quadrange series, Scale 1:24,000, show the locations of the original mile monuments of 1774 and are designated on these maps by mile numbers. Few, if any, of the 1882 monuments are shown on the U.S.G.S. maps. The State Engineer, in his reports referred to above, numbers the monuments consecutively and ties them in by distance to the original mile monuments. For example, I invite your attention to the Wawayanda Sheet of the U.S.G.S. maps on which is shown monument #32. The State Engineer's report refers to this monument as #77 or milestone #"XXXII". He says, "This monument is situated in an open field belonging to Mr. William R. Welling about three paces East of a lane running from his house down across the Wawayanda, and is distant 5,317 feet West of milestone XXXI. At the monument the following bearings were taken: South 34° East about 75 paces to the northwest corner of the main barn, and North 85° West 110 paces to a large hickory tree which stands in the southeast corner of a field and just opposite an angle in the lane; also South 80° East 40 paces to a large hickory distant 9 paces from the lane. Soil sandy. Disc set in sand and monument in cement. This monument was found to be in good condition in every respect." The State Engineer describes monument #78 as being between milestones 32 and 33 on the Lehigh and Hudson River Railroad. He says, "This monument is situated on the track of the Lehigh and Hudson River Railroad and is distant about 2,367 feet West of milestone 32." This monument is not shown on the U.S.G.S. map but you will note that the railroad crosses the State line at the distance given from monument 32. You will also note that the U.S.G.S. map at monument 32 shows the lane referred to in the State Engineer's report and it also shows buildings which possibly may be the buildings referred to.

If one had this descriptive material by the State Engineer and copies of the new 7½ minute U.S.G.S. maps, it would indeed be an interesting and educational project to retrace this line. The U.S.G.S. maps may, of course, be obtained in sporting good stores or by writing direct to the United States Geological Survey, Washington 25, D. C. The State Engineer's report would be more difficult to obtain. It might be found in a good library. However, one would be free and welcome to make copies of the one in this office or, it would be possible to have photostat copies made. The material covers 35 pages in the State Engineer report and, therefore, 35 photostats would be necessary.

With respect to the "dog-leg" shape of the line as referred to in your letter I would say that for ordinary purposes you could probably discount it. It is extremely difficult to run a line absolutely straight for any great distance. This is because the human and instrumental factors enter into it and effect the accuracy. It is only natural that in 1774 the work was not performed as accurately as it would be today. I am of the opinion that this so-called "dog-leg" could only be determined by an accurate transit traverse of the line. Any compass work that the average person would be doing on it would not reveal these angles.—E. G. West, Asso. Forest Surveyor

Catskill trout

Dear Sir: Just a word to let you know that I spent my vacation in Claryville—2 months. I had excellent fishing in the Neversink below the dam and in the Willowemoc above the Town of Willowemoc.

My best fish was a 21", 4½ lb. brown caught in the Neversink. Last Sunday I lost what I judged to be a 30", 10 lb. brown in the Neversink after a 15-minute struggle. The hook simply pulled out. It was the third time that I have missed this fish. I caught numerous 15" 16" and 17" browns and brookies up to 15." They were all vividly colored, fat, with red meat and excellent fighting fish.

I would like to thank you and the Department for the excellent fishing. The $3.25 I spend each year for a license is the best investment I could ever make.

William M. Desmond, Nyack

• *Thank you for your letter reporting on the excellent fishing you enjoyed this summer on the Neversink and Willowemoc. This letter, and the ones you have sent us over the past few seasons, not only indicate that these streams consistently produce good fish, but also that you are a better than average angler.—Kenneth F. Wich, District Fisheries Manager, Region 8*

Tagged bear

Dear Sirs: I would like some information, if you please. We just returned from a stay at Tupper Lake and while there went to the dump on the road to Horseshoe Lake above the Legion Veterans' Camp.

We saw seven huge black bears and I saw three of them had ear tags and I wonder if you have any information about them, how much they weigh, how old they are and where they were tagged?

I remember your story about the 600-pound bear you tagged at Tupper last winter and wondered if it was in this group we saw, some of them looked that big. We also went to the dump near Piercefield but didn't see any there.

Thank you for any information you can give me about the bears.

James Reed,
Lockport

• *The American Legion camp dump apparently is as attractive to bears this year as it has been in past years. Unfortunately, without ear-tag numbers, I cannot supply specific information on any tagged bear at this dump. Twenty-nine bears from this dump have been ear-tagged and released. Of these, twelve have been taken by hunters and information on ear-tag numbers, location and date of kill and several skulls have been turned in to the Big Game Project.*

It's entirely possible the 599-pound bear tagged and released near Tupper Lake has visited the Legion dump. I have no reports that he has been killed yet. Since any bear over 400 pounds is a tremendous creature, a 600-pounder would certainly be noticeable.

The bear ear-tagging operation began in 1956 under contract to Cornell University as a research project and was closed out in 1958. Since then, it has been carried on by the Big Game Project of the Conservation Department. The study was initiated to learn more of the life history and biology of the black bear—information on population densities, total numbers, productivity, movements, growth and weights has been collected. Since 1956, about 345 different bears have been trapped by biologists: one in the Catskills, seven in Alleghany State Park, and the remainder in the Adirondacks.

Hunters have taken 72 of these tagged animals since 1956. Any hunter who kills a tagged bear may receive a $25 reward by sending in the skull (send it express collect), ear tags, kill location and date of kill to the N.Y.S. Conservation Dept. This valuable information will help us to piece together a factual picture of the black bear that can be applied to the proper management of New York's largest big game animal.—Stuart Free, Leader, Big Game Project

Record snapper?

Dear Sir: The picture shows a snapping turtle that may be something of a record for a wild specimen.

It was caught on August 3, 1961, in Kensington Lake, Township of Kensington, Gatineau County, about 100 miles north of Ottawa, Canada.

As it appeared far larger than any snapping turtle I had seen, I weighed and measured it. It tipped the scales at slightly over 46 lbs. The carapace was 19 inches from front to rear. The measurement was made from edge to edge and did not allow for pronounced indentations, both at front and rear. The overall length would undoubtedly have been at least one inch more. Width of carapace was 20 inches. Overall length from snout (with head slightly retracted) to tip of tail was 37 inches.

In your June-July issue, 1958, you mention a possible maximum of 16 inches. Roger Conant, in his Field Guide, gives 18½ inches and up to 35 lbs. as maximum for wild specimen, and Dr. W. B. Scott of the Royal Ontario Museum has informed me in a letter, that this specimen shown on the picture is possibly the largest one on record.

J. L. Jorgensen, Montreal, Quebec

Speed of light

Gentlemen: In your August-September, 1961 issue of THE CONSERVATIONIST, you printed a very interesting article on pages 14 through 17 explaining the stars and universe. On pages 16 and 17 you have referred to the speed of light as 11 million miles per second. This seems to be rather fast, as the text books which I have dealt with indicated the speed of light to be approximately 186 thousand miles per second. I do, however, realize this works out to about 11 million miles per minute, which will probably not make much difference to us on earth.

This brings up another question of your statement on page 17 regarding the farthest galaxies to be observed moving away at 37 million miles per second. Is this also a misinterpretation and should have been 37 million miles per minute?

B. C. Van Kampen, Wyckoff, New Jersey

Dear Sir: In THE CONSERVATIONIST, (August-September) there is an article, "A Hundred Billion Galaxies Over Jones Beach," by Maxwell C. Wheat, Jr.

Halfway in the fourth paragraph on page 17 he says, "Remember light travels 11 million miles a second."

Now in Baker's "Astronomy" it states that the velocity of light is 186,270 miles a second. There seems to be a vast difference between the two articles.

Ralph B. Emery, Lakewood

Dear Sir: Please refer to the August-September issue of THE CONSERVATIONIST, last column on page 17, of the article by Maxwell C. Wheat, Jr. Granting that this is the age of super-speeds, Mr. Wheat is still way ahead of himself.

It is stated that ". . . light travels 11 million miles a second." The most recent figure for the speed of light is 186,282 miles per second. Further, it is stated that, "The farthest galaxies we have been able to observe appear to be moving away from us at 37 million miles a second." This figure should be two-fifths the speed of light. In the next sentence it is stated that "Yet our instruments are detecting them as they were two billion years ago." This latter figure should be two billion *light years* ago, which is the distance of the farthest galaxies we can now see. (A light-year is 5,880,000,000,000—nearly six trillion—miles).

In addition to standard textbooks which will support the above corrected figures, I can recommend a very readable book for the layman which contains a chapter on The Universe: "The Intelligent Men's Guide to Science," by Isaac Asimov, Volume One, "The Physical Sciences," published by Basic Books, Inc., New York, 1960.

Marshall W. Jennison,
Professor, Syracuse University

• *In my article on the universe I am afraid I have been caught exceeding the speed limit.*

Light travels approximately 11 million miles a minute and not a second. Its velocity per second is about 186,000 miles.

The farther the galaxies are from us, the faster they seem to be receding. Instruments have recorded recession speeds up to approximately 37 thousand (not million) miles per second.

I appreciate the writers calling my mental typographical errors to my attention so that I can have this opportunity to set the record right for the readers.

Perhaps I had better start going back to the star gazing sessions at Jones Beach State Park. These are now underway for the fifth year. Those for the next two months are set for 7 p. m., November 12 and 26 and December 10 and 17.—Maxwell C. Wheat, Jr.

Snakes

Gentlemen: While climbing mountains in the high peak region of the Adirondacks last week end with the Adirondack Mountain Club we saw a small snake near the top of First Brother out of the Garden near Keene Valley.

Unfortunately, I didn't see much of the snake and can tell you very little. It was *about* a foot long (who can measure a moving snake?). It seemed to be quite thin —I'd guess about the thickness of a lead pencil. It was barred and a first impression was of the pictures I have seen of coral snakes from the Deep South.

We saw the snake in a crack in the rock on a definitely exposed area in the glaring sun. Vibrations from a person walking disturbed the snake and it moved out of sight.

A little further along the trail in a patch of dead grass I spotted a dead snake skin and it was about the same diameter as the live snake.

This is the first snake I have seen in the mountains and it startled me.

Fred Mohn, Ithaca

• *There is little doubt in my mind that the snake you saw near the top of First Brother Mountain near Keene Valley in the Adirondacks was a milk snake. Milk snakes* (Lampropeltis doliata triangulum, *if you want to give it its tongue twisting scientific name), is a member of the king snake family. The same species in the southwest is often mistaken for a coral snake. The bright reddish brown rectangular patches on a grayish background when viewed from above would definitely give the impression that the snake was ringed or banded with colors. Had you picked up the discarded snake skin and sent it to us we would have been able to identify it positively. The snakes shed their skins periodically and your snake may have shed its skin recently. It would make its color appear much more vivid.*

The milk snake is a far ranging animal and may be found in almost any situation from marshlands and bogs to mountain tops, although they are rarer in the latter situation. There are no poisonous snakes in the area in which your hike took place. We are happy to note that there are people who do not fear snakes—I'll admit that I am somewhat fearful myself of the poisonous varieties and if I handle them at all it is with extreme care and if I meet with them in the wild I treat them with utmost respect.—E. M. Reilly, Jr., Curator, Zoology, N.Y.S. Museum and Science Service

Ammo. to minors

Dear Sir: Can anybody purchase ammunition, regardless of age, if he holds a hunting license?

Anna Adamec, Broadalbin

• *Section 1896 of the Penal Law prohibits the sale of firearms or ammunition to any child under the age of sixteen years. This prohibition holds even though the minor holds a hunting license.—R. J. Vickers, Asst. Supt., Bureau of Law Enforcement*

English wood pigeons

Mr. Editor: Mr. Canfield's letter to THE CONSERVATIONIST, appearing in the June-July issue, has indeed brought up a very interesting point concerning English wood pigeons.

As one who has spent many years in the Midlands, I agree with this gentleman. The bird is a fast flier, and a target worthy of any gun, although it does not always qualify as good eating.

In England, pigeons do some damage, mostly where farmers do not allow hunters to keep their numbers down. The birds will flock to feed on barley, wheat, clover and kale. To my knowledge they will not touch potatoes. The fact that pigeons flock can also be an advantage; this makes it easier for the guns who, well hidden, will take a heavier toll than hunting the birds singly.

Farmers I knew, did not complain of pigeons. Their presence helped many in the letting of hunting rights, especially since mixymatosis practically wiped out the rabbit population.

One must also bear in mind the number of hunters. In Great Britain, shooting has never been a popular sport. To give an example, a dozen or so of us only, carried a license in a town of nearly 8,000 people. Would this be the case in The States?

Pigeons are not so prolific (raising two young, more frequently one per brood) as to require an open season for many years to come. The damage caused would be small, considering the great sport these birds would provide the hunting community, and the benefits derived by the allied trades.

H. Dorin, Schefferville, Canada

Swimmers

Gentlemen: What makes a miniature chipmunk swim a fair-sized stream?

I was trout fishing on the Gulf Stream, in the Town of Fine, St. Lawrence County, May 22. I saw what I thought was a floating leaf, but it turned out to be a small chipmunk who swam all of the 25 or 30 feet landing right at my feet, lying there for a minute or two to catch his breath.

He was quite small and the side markings were not too distinct, so I assume he was a young one. There seemed to be nothing after him, and if he had fallen in from the side of the stream he would not have had to cross.

He was really quite a swimmer and was well buoyed up by the air caught in his fur.

I'm curious, having never seen a chipmunk swimming before.

Wendell R. Ames, M.D., Rochester

• *Just recently many individuals of the squirrel family have been found swimming streams and rivers. Apparently, great numbers of the gray and some red squirrels have been reported attempting to swim the Hudson River. In this case, there seems to be other factors than those mentioned above. One such factor is a possible tremendous increase in the population of the squirrels due to more of the young of the year surviving then might be expected, or a failure of the plants on which the squirrels subsist to produce a normal amount of fruit. This would naturally cause many of the individuals to move out of the crowded or famine area in search of living room or food.*

It would be foolish of me to insist that what you saw is probably a young red squirrel instead of a young chipmunk but these two are often mistaken for each other and there is some confusion during the summer months. It is not important as to which one it was except that the "migration" from one area to the other has been mainly restricted to the red and gray squirrel and I have had no report, as yet, of chipmunk migration.

Almost every animal can swim to some extent. Some animals get into the water only accidentally, others only occasionally under certain pressures. Cats notoriously avoid water but all cats can swim and some even like to get into the water. Tigers quite often go for swims in rivers and lakes apparently for the sheer pleasure of it. I once saw a sloth swimming in a lake in Panama. It's hard to imagine such a slow moving animal going into the water but this one was having no trouble and seemed to make it quite easily.—E. M. Reilly, Jr., Curator, Zoology, N.Y.S. Museum and Science Service

Water chestnut

Dear Sir: We own and live on what used to be two small islands, along the west bank of the Hudson River at Saugerties. Now this is really a peninsula due to "spoil" in back of us from dredging years ago of Esopus Creek.

We have been worried for the past few years over the water chestnuts filling up our remaining open water (which is now all shallow—three to five feet high tide). We had such a carpet of this water chestnut, I've written many letters to Army engineers, your Conservation Department and Department of Public Works, etc., trying to find some way to control it with no help offered or any reasonable solution suggested. My husband has pulled out boat loads every year.

This early summer, the chestnut grew again as usual, but about a month ago we noticed huge, green masses of floating water chestnuts, drifting out with each high tide; and they are all gone! Why? The black dried seeds wash in on the shore as usual but nothing is growing (at least no water chestnuts) in either of our "coves." My husband says the heavy ice last winter did it but in that case why did they grow early? No one has cut or sprayed them; there have been no unusual high tides or winds to take them out either. So why? And will they come again?

Ruth Reynolds Glunt, Saugerties

• *Although some tendency to break loose and drift is characteristic of the water chestnut plant* (Trapa natans), *the clearing up of a large area from natural causes is indeed a mystery. This plant grows in sheltered coves with soft bottom suitable for attachment by roots. It is entirely possible that ice action or other causes may have changed the bottom without scouring out the seeds. Probably the plants subsequently grew normally for a time but then perhaps failed to root securely. As the buoyant surface leaves grow larger in midsummer, they would exert increasing stress on the roots when wind, tide and other forces are involved. This may be a possible explanation of why patches of the weeds broke loose from time to time.*

As to the future outlook, it is probable that the 1962 crop of water chestnut in this area would be much reduced. However, this plant has considerable tendency toward delayed germination of seed so that even if we assume no seed production in 1961 on this site there would be some germination of older seed.

Unfortunately, even a light germination of water chestnut can produce a dense stand as the plants branch profusely if they have room. However, hand pulling of the small plants before they branch out can be very effective. It is, of course, very discouraging to try and pull up large mats of these plants by hand but this method can be highly effective if infestations are light and work is started early.—John R. Greeley, Chief Aquatic Biologist

Bugs and worms

Gentlemen: Two questions: What is the bug or larva that is found in the ball on the stem of golden rod?

What are oak leaf worms, where found, etc.?

Harold Lush, Rochester

• *The gall found on the stem of the golden rod is the ball gall,* Eurosta solidaginis. *The galls caused by this insect are found in the main stalk. They are globular, ball-like and about one inch in diameter, pithy inside with a rounded cell in the center.*

Your question concerning oak leaf worm, where found, etc., covers a fairly large number of insects, each with its own special life history. In Connecticut, where large areas of oaks were stripped this season, the State Entomologist reported finding twelve species on a single twelve-inch branch of black oak.

In New York State, large areas of oaks were stripped of their foliage by various combinations of leaf rollers, canker worms, forest tent caterpillars and gypsy moths. The combinations of leaf feeding insects varied in the different parts of the State.—William E. Smith, Forest Pest Control Foreman

Free-loader

Dear Sir: Two weeks ago a wild duck flew in with our Peking ducks. He leaves every night just at dark and comes back every morning as soon as the fog lifts or as soon as it is light.

Our ducks do not like him and quack whenever he moves. We have looked through several books but cannot identify him. We hope you can help us. We hope he will stay this winter but expect every time he leaves that he will not come back.

He has a black head, the eyes are black, his bill is a pinkish white with a black band going across it, there is a bit of red at the upper edge. There is a hook in the center of the upper bill. His bill is narrower than our Peking ducks'. His wings are large and are an iridescent green and black. The body feathers are more on the brown side. His legs and feet are black. There is a V-shaped bib on his breast of black and white with a few white feathers going around the neck. Not solid like the mallards. Between his legs there is a Y of white, too.

He is not too afraid of us and we can get up to about two feet from him. He likes it up high and is forever on the porch railing which is at least 14 feet from the ground. He has even tried the bird feeder which wobbles under his weight.

Mrs. Lawrence MacDonald, Little Falls

P.S. He does not seem to be able to quack or make any noise, at least we have never heard him.

• There is little doubt in my mind but that the strange duck that has joined your Peking ducks is one of the Muscovy ducks. This is a large duck native to Central and South America which has been domesticated for many years. Its predominant colors are black with a greenish sheen and white. The wild duck always has pretty much the same pattern of those two colors but varieties have been developed and the bird has been crossed with other species and some of these varieties look like the one as you describe in your letter. The Muscovy duck has attained some popularity among duck breeders in New York State but not on a large scale. The fully grown ducks are not as good eating as our other domesticated ducks, but the young duck are said to be more delicious. By habit it is a much more quiet duck, seldom making any calls or noise.—E. M. Reilly, Jr., Curator, Zoology, N.Y.S. Museum and Science Service

Trap and transfer

Dear Sir: Have any attempts to live-trap and relocate gray squirrels ever been made? If so, were they successful?

We have an overabundance of these animals in Nassau County which was recently almost completely urbanized. Would it be feasible to live-trap and transfer them to the new co-operative hunting areas in nearby Hudson Valley or are there some unusual problems involved?

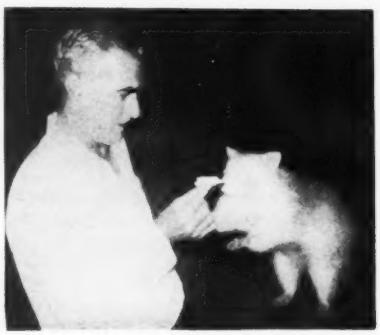
Donald C. Clark, Malverne

• There has been at least one successful gray squirrel trap and transfer program. Squirrels from North America were introduced into England and have since become one of their major pests. Undoubtedly there have been many other gray squirrel transfers at shorter distance, some of which may have been successful and many of which I am certain must have been unsuccessful. The relocation operation you are suggesting probably would be unsuccessful in that it involves moving animals to another location which already undoubtedly is carrying the maximum number that the environment will sustain. Squirrels need snug den sites and a cached food supply in order to survive. It is a certainty that suitable areas to which squirrels might be moved would have the desirable home sites already occupied. Moving in new squirrels would set up some fierce conflicts and intense competition.

Field studies have shown, also, that there is a very well developed hierarchy or "peck order." In other words, there is a dominant squirrel in a group and each squirrel thereunder fits into the pattern of dominance it has been able to establish.

As still another factor, squirrels store food supplies for the winter. This has largely been done for the winter to come. Movement of squirrels from one location to another means leaving their stored food supplies and increasing the competition for food in the area to which transferred.

Although the factors may vary species to species, these conditions pertain pretty much to any relocations of animals to areas where the species already exists. It has been found that trap and transfer operations have their greatest potential for success when animals are introduced into a new environment where they do not compete with their own kind or related species. Even these can succeed too well in some instances, as in the case of the gray squirrels in England or the starling in America.—Joseph Dell, Chief Wildlife Biologist



Blond 'coon

Dear Sirs: Am enclosing picture of an "albino" raccoon that visits our porch nightly for food.

She has become quite tame and often brings her two offspring which are natural raccoon color. They, too, have become tame and call nightly for their food which is bread and honey (hand fed).

LeRoy C. Knapp, Colden

Metallic trees

Gentlemen: If possible, we would like to have information as to what we should do about this situation. We have been having some lumber cut on our premises at Lake Summit, Argyle, Washington County. When we had the lumber brought to a lumber yard in Greenwich, they refused to purchase same because they claimed there was too much mineral content found in the lumber.

We would like to know the following: Is the fact that there is so much mineral in the lumber evidence of minerals present to a great extent in the soil. Would this call for an examinaiton of the soil to identify the quantity and extent of these minerals? Who would be interested and qualified in undertaking such an examination? Approximately how expensive would this be? Is lumber which contains a large amount of minerals not usable? To what extent?

Robert L. Shurr, Argyle

• Mineral streak in lumber is not an uncommon occurence, being found to some degree in all parts of the State. This is a de-grade in appearance, but not in the strength of the wood, and is quite common in the maples, especially the soft maple. The streaks are usually caused by oxidation or other chemical changes in the wood.

I know of no correlation between mineral streak in wood and the presence of large deposits of mineral in the soil and rather doubt there would be any.—E. H. Huber, Senior Forester

Dear Sir: I have just returned from a visit to our camp area—on Lake Summit, Argyle. On the occasion, I have spoken to Mr. Parrish of Hudson Falls who is a woodsman with a most expert knowledge of forests and trees. Mr. Parrish, who has been doing the cutting on our grounds, informed me that the oak and beech that he cut (quite an amount of it) contained 40 per cent mineral content and that content could only have come from the soil. This lumber he found difficult to sell because of this content.

He told me of a previous experience of his in an area around Schroon Lake where he had encountered a similar situation, minerals were located of a somewhat valuable nature and that digging for minerals resulted.

Robert L. Shurr, Argyle

Guns after dark

Dear Sir: I understand a person carrying a gun after dark in his car has to put his gun in the trunk traveling to and from the hunting grounds.

Leslie D. Fox

• It is illegal to "carry or possess in or on a motor vehicle, when using an artificial light, any bow or firearms (except a pistol or revolver) unless it is taken down, securely fastened in a case, or locked in the trunk of the vehicle."

This law was placed on the books in an attempt to reduce the "jack lighting" of deer and is published in the Hunting-Trapping-Fishing Guide.—Editor

Rose Mountain

Dear Sir: I read with interest the article about Slide Mountain in the June, 1961 issue. It was most historical and enlightening. Why anyone in the past would have thought High Peak to be higher than Hunter is rather startling.

The view of Big Indian Valley and Slide from Rose Mountain is one of the most magnificent in the Catskills. Years ago I remember climbing up Rose Mountain to the last farm clearing below the north ridge and cliffs. I saw up there an old family cemetery with a large tombstone for a William Rose, who died, I believe, in 1826. Was the mountain named for this family of original settlers, or was it named after the flower which N. Y. State adopted as its own in 1955?

I also understand that recently the State acquired by gift, over 600 acres on Rose Mountain from Mrs. Howland, the widow of Colonel Rochester who assembled the tract. I believe the old Colonel, whose forbears settled Rochester, (N.Y.) was the U. S. Army paymaster in Italy in the first World War. His former residence should be opened up by the Appalachian Mountain Club, Boy Scouts or a hikers' organization as a focal point. A panoramic photograph could be taken and printed in THE CONSERVATIONIST, in order to bring to its readers another of the unpublicized "diamonds" in the Conservation Department's holdings.

Roy L. Halsted, New York City

• *In reply to your question of how Rose Mountain got its name, all the evidence I have seen makes it clear that the mountain was named for the human and not the floral roses. Early settlers in the Catskills appreciated the beauty of wild flowers, but they didn't name mountains for them. Instead, they used names that had a practical value. If you name a mountain for its shape—Round Top, Doubletop or High Point, the mountain will be more useful as a landmark. Names like Oak or Beech mountain or Pine Hill can help a man trying to find his way through an unmapped wilderness. Naming a mountain for its owner or the settler on its slopes helps keep land records straight and names like these have been in use ever since the white man began taking possession of land in the Catskills. That curious name, Ticetenyke, in its various spellings, goes back to a man named Matthias Ten Eyck. If he had been our neighbor we would have called him Matt; the Dutch liked to use the last syllable of a man's name as a nickname so they called him Thias Ten Eyck and we still know his mountain by that name.*

Some mountains, of course didn't have any names at all and the people who lived near them a century and a half ago wrote in their account books of "drawing 2 loads of bark off the mountain" or "chopping wood on the mountain." It is easy to see why all this led to confusion. Owners and settlers changed and the names of mountains changed with them. Some mountains in the Catskills changed names as often as a modern woman does her hairdo.

It wasn't until Arnold Guyot came long and published his map in 1879 that the Catskills were properly christened. Guyot didn't like the fanciful or poetic names that were coming into vogue in his day, so unless these were very thoroughly accepted he brushed them aside and went back to setting down names that reflected the shape or other characteristic of each peak and hill. Sometimes he used the names of local settlers and this was what happened in the case of Rose Mountain which was already being called by that name in the neighborhood.

Thanks for the information about the burying ground on the mountain. A few days ago with 83-year old Timothy Remick of Rose Mountain Farm as a guide, I found the place and saw William Rose's stone. The forest is rapidly surrounding the stone-walled plot and gnarled seedling apple trees stretch their arms across the grave. But the massive slab of Rose Mountain bedrock is still there—a suitable monument to a man whose family name is borne by the mountain on which he once worked with axe and plow.—Alf Evers, Lewis Hollow

• *With reference to your question concerning the acquisition by the State of 600 acres on Rose Mountain from Mrs. Howland—Mrs. Louise M. Howland presented this land to the State as a gift by deed of conveyance dated August 27, 1951.*

Colonel Rochester, who was Mrs. Howland's first husband, assembled this tract parcel by parcel. Mrs. Howland told me that the Colonel brought her there as a bride. They were married in front of the fireplace in the Rose Mountain house. Colonel Rochester felt that after he and his widow were finished with the property it should go to the State and become part of the Forest Preserve. It was in compliance with these wishes that Mrs. Howland made the conveyance to the State.

Because the property is now Forest Preserve any development or restoration of it is limited under the provision of the Constitution. However, I am sure that Colonel Rochester realized this and that it was in keeping with his plans to have it under the protection of the Constitution's "forever wild" clause.

As you probably know, the view from the terrace in front of the Rose Mountain house looking up the Big Indian Valley to Slide Mountain is one of the finest in the Catskills. Some years ago I had occasion to triangulate the distance from a cross cutting on a stone in front of the house to the tower on the summit of Slide Mountain and found it to be 53,007.23 feet or just under 10½ miles.—Edward G. West, Associate Forest Surveyor

Seeds

Dear Sir: Why doesn't the Conservation Department issue a package of seeds to the sportsmen when they purchase their hunting or fishing license? The package of seeds would be seeds for trees, wildlife, such as wild grapes, berries, nuts, etc.

The sportsman would go to his favorite hunting grounds and, with the heel of his boot, impress dirt and drop in seeds. As the years go by he could see results.

I'm sure this would help our wildlife and have a great part in reforestation. Also, the sportsman would be more than glad to oblige, thus making his or her hunting or fishing ground a better place to go to.

Robert J. Pitcher, Elmira

• *This will acknowledge your letter in which you suggest that the Department supply seeds to sportsmen when they purchase their hunting and fishing license.*

Your idea, at first glance, would seem to be an excellent one. However, there are a number of stumbling blocks. For example, each plant has requirements and tolerances which differ from others. Some plants have seeds which need special treatment before dormancy can be broken. Also, as a very large proportion of hunting is done on private lands, such planting may be in conflict with landowner interests and desires. Finally, a desirable plant in one locality may be a pest in another.

Next, let's consider the matter of cost. Providing each hunter and fisherman with a package of seeds or nuts would mean the annual purchase of well over 1,000,000 packets. Assuming a nominal cost of only 25 cents a package to the Department, this would amount to a cost of about $250,000. Undoubtedly a large share of the seeds would never be planted while many of those planted would fail because of unfavorable soil or moisture conditions, weed competition or other factors. Those that lived might be poorly located for their ultimate use by game. At best an indeterminate but probably small number of plantings of proper food or cover plants, located where they would help game, probably would become established. However, all factors considered, including expense, we feel that the Department's present programs for planting trees and shrubs have in them the ingredients of control which are lacking in a seed distribution plan. This involves putting desirable plants where they will find conditions suitable for their growth, in numbers and arrangement required to accomplish the intended purpose. If special attention such as site preparation and mulching is called for, this also would be provided. The single most important point in making any plantings for game is to provide for food or cover deficiencies in an otherwise suitable environment. Adding fall food is of little value if the deficiency is in winter shelter or summer nesting cover and vice versa. Planting plans, in current operations, are being developed by individuals trained in forest and wildlife management principles which includes a knowledge of the year-around food and cover requirements of wildlife.—Albert G. Hall, Chief, Bureau of Game

Credits

Covers, pages 6, 20, 24, 25. H. Wayne Trimm; 3, 4, Conservation Education, Nick Drahos; 5, Conservation Education; 7, Trimm, William A. Pearce; 8, 9, 10, U. S. Forest Service; 12, 13, Adirondack Museum; 15, E. W. Good, Fulton, Trimm; 16, 18, Anne LaBastille Bowes; 17, Bowes, Roy Irving; 19, Howard A. Loeb; 21, Irving; 26, Dr. Donald W. Fisher, Irving; 28, 29, Drahos; 30, 31, Edwin H. Ketchledge; 36, 38, Earl McGuirk; 37, Buffalo Museum of Science; 39, Paul Benoit; 40, Cardinali Studio, Fulton; 41, Fred Chambers.

How To Collect Fossils

by Dr. Donald W. Fisher, State Paleontologist

LOCATING fossils is 90 per cent luck and 10 per cent skill, but collecting and preparing them is 90 per cent skill and 10 per cent luck! The generalized geologic map on page 26 indicates the most likely areas for fossil collecting. Potential collecting sites are quarries (preferably inactive), stream beds, field exposures, railroad cuts and road cuts. Naturally, permission should be obtained before attempting to collect on private property. After securing the right to trespass, common sense dictates how you use your privilege.

The primary equipment of the fossil hunter is a pair of sharp eyes, ample patience and a few tools. On the facing page you will see a sketch of some of these tools. Not all are necessary but these and others facilitate collecting and preparation. In places, fossils may be found loose, in sand or as weathering products from rock. But in New York State, this is the exception rather than the rule and, therefore, good hammers are absolutely necessary to break rock. The common household hammer, the carpenter's or machinist's hammer, is wholly unsuitable. Instead, a stone mason's hammer with a chisel edge (7) and a one-handed sledge or crack hammer (9) are my preference. Varied-sized cold chisels (10, 11, 12, 14) are highly useful. To prevent sliver-like rock fragments from becoming imbedded in your hand, durable cowhide or deerskin gloves are recommended. If eyeglasses are not normally worn, some protection for the eyes is mandatory. Safety or sun glasses (13) will do. A small magnifying hand lens (16) is a must as many small fossils and delicate structures of larger ones may escape your naked eye. To prevent marring, fossils should be wrapped in the field with newspapers, tissue paper or aluminum foil (5). Small cloth bags (17) are good for small fossils; stronger canvas bags with drawstring (6) are necessary for larger slabs. Careful handling must be given delicate fossils. Cigar boxes or plastic containers (15) packed with cotton are ideal. Fossils should be labelled at the time of wrapping. Notation should include *exact* location of find, date, kind of rock, name of formation (if known), name of fossils (if known), name of collector. A field notebook case (1) is handy but not essential. A camera is an asset for it is sometimes desirable to photograph the fossil in place before extraction is attempted. In the event of breaking during extraction (which is common), the jig-saw puzzle is sometimes more easily solved in the laboratory if a previous photo has been taken. Duco household cement or a similar plastic cement is an indispensable repair tool. Finally, a sturdy canvas rucksack (4) serves for carrying the haul. When seeking fossils in sediments (scarce in New York), shovels, small trowels and whisk brooms are used. Bones ought to be shellacked in the field to inhibit break-up. Then they should be bandaged with cloth soaked in plaster of Paris to impart rigidity so that they may be transported.

The nature of the fossil and matrix determines the manner in which the specimen is cleaned after being brought in from the field. Some obscuring excess rock can be removed by a rock trimmer or hammer and chisel. Brushes (2) are satisfactory for removing clinging matrix from narrow shallow depressions on rough fossil surfaces. Mounted needles, called teasing needles (3), or nutpicks will do the job but they are time-consuming. Small power tools are efficient and relatively inexpensive. I prefer a vibrating tip engraving tool (Vibro-tool) (18) for rough chipping and a powered dental drill with assorted points for revealing detail. Chemical reagents may be employed in recovering fossils whose chemical composition is different from the matrix. For example, silica fossils may be isolated from limestone (calcium carbonate) matrix by immersion in dilute muriatic (hydrochloric) acid which dissolves the matrix.

Additional preparation is imperative for those who wish to identify sponges, corals, bryozoans, snails and cephalopods. Most fossils are described on the basis of their interiors. In order to learn something of the inside, polished surfaces and thin-sections must be made. A polished flat surface is made by pressing the specimen against a power driven grinding wheel. If such a device is not available, the same result can be accomplished by spreading, on a flat glass plate, progressively finer grades of carborundum abrasive, mixed with a little water for lubrication and applying a circular motion. Polishing is done on *another* glass plate upon which has been spread jeweler's rouge or tin oxide. Care must be taken that the plates are thoroughly washed before the next grade of grinding powder is used. Contamination can cause undesired scratches. An effective way to obtain a polished look without actual polishing is to coat the section with clear plastic spray (Krylon) or brush with clear shellac. Prior to polishing, it may be helpful to have a transparent peel. This is made by slightly etching the ground surface with dilute hydrochloric acid, washing off, and flowing on a layer of collodion or parlodion. The resultant acetate peel records an impregnation of the cellular structure. In preparing thin-sections, a thin slab ($\frac{1}{8}$" x $\frac{1}{4}$") is glued to a glass slide with Canada Balsam, bioplastic or a similar type adhesive. The section is then ground down until the structural details are visible.

Should a fossil occur as a mold, it may be advantageous to make a cast of plaster of Paris or dental wax. Liquid rubber, applied in layers so as to build up a cast, is less messy but ammonia fumes from the solvent may be irritating. Fossil molds should be greased with motor oil so that the cast will not stick.

Photographing fossils is especially rewarding. Each person develops his own techniques. Proper exposure and lighting are gained through experience. In general, flat fossils should have low incident light; rough or high relief ones should have high incident light. Usually two lights are used, the stronger coming from the upper left. Coating with a thin haze of ammonium chloride or burning magnesium ribbon and allowing the oxide smoke to collect on the fossil improves the highlights. Personal preference governs choice of camera.

The careful collector should, like the efficient scientist or file clerk, keep his material orderly. This means properly labelled in as dust-free a place as possible. Cardboard trays, floored with cotton and separate inked labels, in shallow drawers are the usual method. Though somewhat expensive, plastic transparent boxes are especially adaptable to small fossils. They not only keep out dust but allow the viewer to observe without handling. Your collecting localities should be spotted accurately on a topographic or geologic map. Do not rely on your memory. The value of a collection is immeasurably increased by the preciseness of locality data.

Now you are ready to identify the find. The Conservation Department and State Museum have, for the asking, a suggested list of books on fossils. You may be discouraged because species look alike, or maybe you can't find your specimen in any book. Perhaps the competent paleontologist can't find it either! Here, then, is the reward of the fossil hunter, for you are now the discoverer of an, as yet, unknown creature —never before seen by man. Good fossil hunting!

Wayne Trimm

Reconstruction of Chazyan Sea scene; what you would have seen had you been here 465 million years ago.

1. Green algae; 2. Brown algae; 3. Snail *(Maclurites)*; 4. Nautiloid cephalopod *(Cameroceras)*—straight swimmer; 5. Nautiloid cephalopod *(Valcouroceras)*— coiled swimmer; 6. Nautiloid cephalopod *(Gonioceras)*—straight crawler; 7. Snail *(Bucania)*; 8. Blastoid *(Blastoidocrinus)*; 9. Cystoid *(Eumorphocystis)*; 10. Cystoid *(Canadocystis)*; 11. Snail *(Scalites)*; 12. Trilobite *(Thaleops)*; 13. "Moss" animal, bryozoan *(Phylloporina)*; 14. "Moss" animal, bryozoan *(Chasmatoporella)*; 15. Brachiopod *(Rostricellula)*; 16. Cone hydra, conularid *(Pseudoconularia)*; 17. Brachiopod *(Plectorthis)*; 18. Trilobite *(Isotelus)*; 19. Snail *(Raphistoma)*; 20. Sponge *(Zittelella)*; 21. Snail *(Loxoplocus)*; 22. Coral *(Lichenaria)*; 23. Trilobite *(Bumastus)* shedding; 24. Trilobite *(Glaphurus)*; 25. Stromatoporoid *(Stromatocerium)*; 26. Trilobite *(Calliops)* dead.